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Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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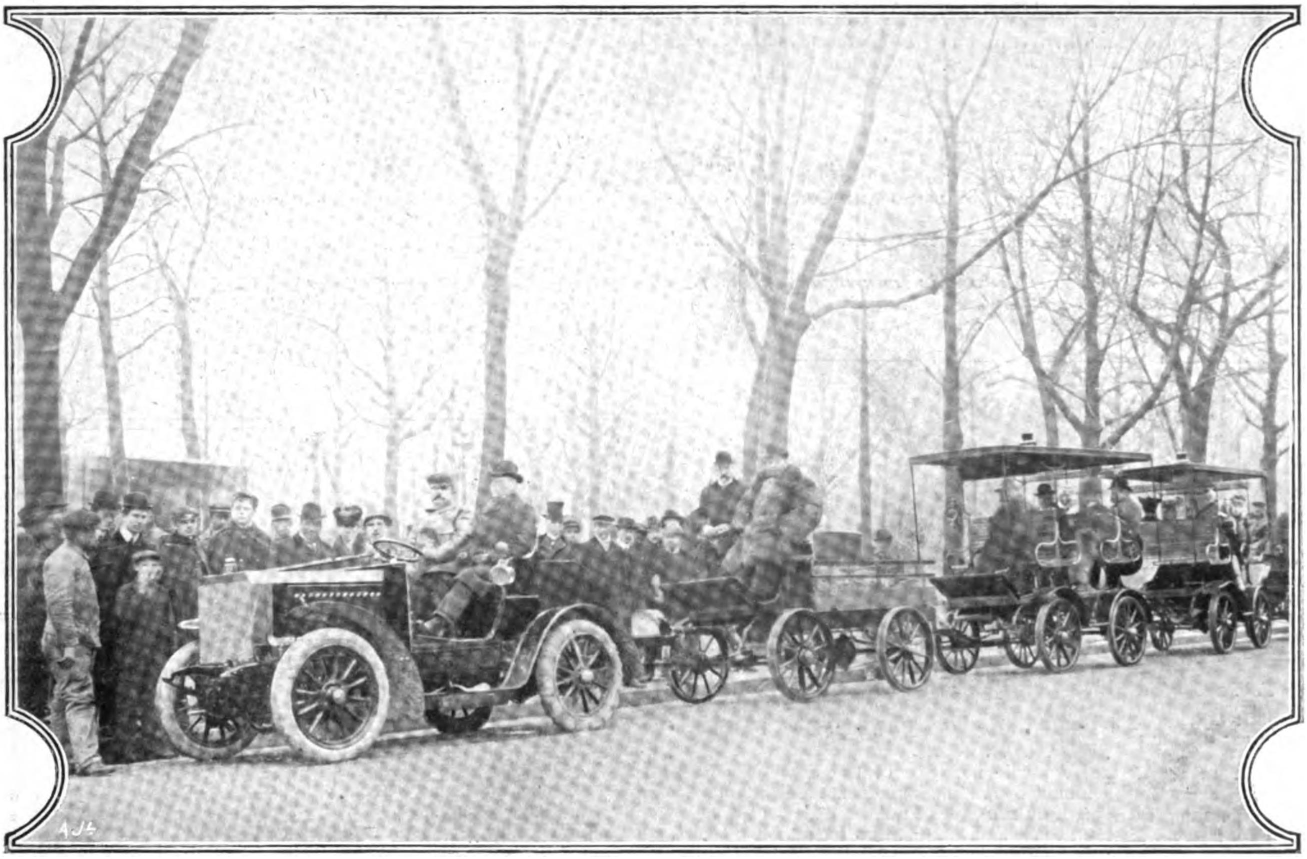

Everyone who has been to the Paris Salon, and most of those who have not, have heard of the motor train devised by Colonel Renard. We gave some illustrations of this in a previous issue. The above photograph shows the train in actual operation. The rear wheels of each of the trailers are driven from the tractor through gearing from a propeller-shaft (with a number of universal joints) which runs the whole length of the train. This arrangement gives great climbing power, enables a light tractor to be employed, and may have advantages for military purposes, but it remains to be seen whether the advantages compensate for the increased mechanical complication and the loss of power in transmission. Possibly the recognition of the advantages of Colonel Renard's device from the military point of view may explain the great popular interest and enthusiasm which greeted the train on all its public appearances in the Paris streets, and notably when inspected by President Loubet on Tuesday.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Jan. 13 ...	"Motor Vehicles," by W. Norris (Liverpool Engineering Society).
Jan. 15–23 ...	Leeds Cycle and Motor Show.
*Jan. 21 ...	The Motor Car Act, by Earl Russell (A.G.C.B.I. Paper).
*Jan. 28 ...	"Railway Companies and the Motor Problem," by Mr. George Montagu, M.P. (A.C.G.B.I., Paper,)
Feb. 2–6 ...	Liverpool Cycle and Motor Show (St. George's Hall).
*Feb. 3 ...	"Why Motor Cars" by "Cargill Gentry" (A.C.G.B.I. Paper).
Feb. 12–24 ...	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
*Feb. 12 ...	Quarterly 100 Miles Trial.
Feb. 23–27 ...	Hull Cycle and Motor Show (Assembly Rooms).
Mar. 4 ...	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
Mar. 25–30 ...	*Side-Slip Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

* Automobile Club of Great Britain and Ireland Events.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Jan. 16–23 ..	Madison Square (New York) Show.
Jan. 23–Feb. 4	Brussels Automobile Salon.
Jan. 24 ...	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Jan. 25–30 ...	Ormond-Daytona Races (Florida).
Feb.	Tourist Run and Consumption Trial (*L'Auto*).
Feb. 3–6 ...	Paris-Turin Tourist Run (*France Automobile*).
Feb. 6–13 ..	Chicago Show.
Feb. 23–27 ...	Anti-Skid Trials at Versailles.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Mar. 23–27 ...	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15 ...	Mediterranean Motor Boat Week.
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Nice-Rome.
May	Guadarrama Hill Climb (A.C. Spain).
May 1–12 ...	A.C. Bordelais Automobile Fortnight.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Circuit des Ardennes (A.C. Belgium).
June 7 ...	Namur Week.
June 7 ...	Spa Week.
June 17 ...	Gordon-Bennett Race.
July	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 23–25 ...	Lucerne Motor Boat Races.
Aug. 5–11 .	Paris–Deauville Motor Boat Race.
Aug. 12	Motor Boat Race for Gaston Menier Cup.
Aug. 15 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

CONTRIBUTIONS AND ARTICLES.

Contributions and articles likely to prove of interest to our readers will receive due attention, but in all cases the name and address of the writer must be given, not necessarily for publication.

All matter intended for publication should be addressed to THE EDITOR OF "THE AUTOMOTOR JOURNAL," 44, *St. Martin's Lane, London, W.C. Stamped envelope must be sent if the manuscript is required to be returned.*

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1903.

THE year which has just come to a close is one which very few people will regret. The weather throughout has been phenomenally bad, records of unpleasantness having been reached month after month. The general trade of the country has been far from prosperous—doubtless an indirect result of the disorganistion of the seasons. People get ill-tempered at persistent bad weather, and a general state of ill-temper is prejudicial to business projects generally. 1903 has been a bad year. It is well it is over. So wet, inclement, and unpleasant a season has necessarily produced a prejudicial effect upon the automobile industry. But it is satisfactory to be able to state that in spite of this, in spite of the fact that it is just the automobile industry which one would expect under the circumstances to be more affected than almost any other, its progress has continued to be most satisfactory. As we can hardly anticipate the recurrence of such a depressing year either from a meteorological or general business point of view, we look forward to a period of greatly increased activity in the motor car world during the year on which we have now embarked. The evidences of increased general interest in the movement have been palpable everywhere. The exhibitions which have been held during the past year have surpassed in the number, interest, and high technical excellence of the exhibits, all previous efforts in the same direction. The English exhibitions held in this country have greatly excelled those of the previous year in these respects, and the same may be said to at least as great a degree of the Salon which has just closed its doors in Paris.

The general tendency displayed at these exhibitions has been towards the adoption of more or less standard types—a most satisfactory sign, and a stage of progress which must be reached before the full development of the trade on a commercial basis can be expected, and this more general acceptance of certain typical standards of construction, coupled with the wider experience gained, has put manufacturers in a position to undertake on a larger scale than hitherto the development of the commercial vehicle on a profitable basis. Probably, however, the most solid evidence of progress was furnished by the large number of vehicles which in this country successfully went through a more elaborate and exhaustive system of tests in the 1,000 Miles Reliability Trial than a similar number of motor vehicles had ever been subjected to before, while the increase in the interest taken in this event by the general public was most noticeable.

All British automobilists have very naturally regretted that the British competitors in the Gordon-Bennett Race were not successful in retaining the Cup in this country, but there can be no doubt that the occurrence of the event in the United Kingdom has proved distinctly beneficial to the British industry, and has had considerable effect in stimulating popular interest in automobile development. Though the English competitors lost the race, the authorities at any rate gave a magnificent object lesson in the way in which a race should be conducted. Everything went off without trouble or hitch, and the arrangements adopted have been recognised even in France and Germany as the model on which all such events should in future be conducted.

Not less noticeable than the progress in automobilism, and in the nature of things more sensational, have been the results attained by the numerous inventive and intrepid experimenters who, with astonishing energy and courage, have attempted to extend man's command over the air. The Lebaudy airship has successfully performed journeys of a length and at a speed never previously approached, and has displayed an independence and superiority to adverse atmospheric conditions which many of the wiseacres had previously predicted it was impossible an airship of the navigable balloon class could ever attain. The misfortune which ultimately overtook the "Jaune" was an unlucky accident, pure and simple, and is not to be regarded as in any way throwing discredit upon the general correctness of design of those who projected and built the machine.

Less conspicuous but possibly more pregnant with possibilities for the future are the quiet experiments in pure aviation—true independent bird-like flight—which were being simultaneously conducted by the Wright Brothers in North Carolina. They, too, have added to their record, exploits which, in that particular department, are almost more astonishing than the records of the Lebaudy airship.

Everywhere on the roads and in country districts, the evidences of the spread and increasing popularity of the automobile movement have been most encouraging. Not least amongst these hopeful symptoms, rightly understood, was the outburst of antagonism which took place at the period, when in ordinary years we should have had the dog-days, and culminated in the Juggernaut correspondence of the *Daily Telegraph.* Rightly regarded, we say that this outburst of unreasoning prejudice was the strongest evidence of the growth and increasing prosperity of the new industry, and the hold which even its opponents were beginning to feel it had obtained in this country. Every new movement has to suffer from a period of active hostility on the part of the unenlightened. It has been so with nearly every great tendency that has contributed to modern progress, and the outburst does not come till the new movement has obtained a strong toothold. It is the invariable indication that it has come to stay.

And we believe the Juggernaut crusade has ultimately done the movement good. All its enemies had opportunities of expressing themselves—frequently with great virulence, and almost always at interminable length—in the pages of the *Daily Telegraph* and elsewhere. The British public is fundamentally fair-minded, and sooner or later a reaction sets in in favour of any cause or any set of people that have been unfairly and unduly abused. Such a reaction is being fully felt now.

It is as well that it should be so, for while the tide of hostility was at its height the prejudice evoked was most unfairly utilised to very prejudicially affect the Motor Car Bill which was passed into law in August, and came into legal operation yesterday. The provisions of this Act very naturally at the present moment fill the field of view of practically all automobilists.

Every automobilist is probably only too well aware that the Act forbids under very heavy penalties a number of offences of which the principal are driving at excessive speed, or so as to endanger other users of the road. We have dealt with these points at sufficient length in the past. There are other positive acts which the statute enjoins shall be done. It is probably superfluous to call to the minds of our readers what these are, as doubtless practically all of them have already performed them. But in case there are any who have been forgetful on the subject, we would remind all who are in possession of a motor vehicle that they must at once register it with either a county or borough council, must provide it with the number plates back and front bearing the number allotted to it by the registering authorities to conform to the rules, and must provide a lamp in such a position as to illuminate the number-plate at the rear after dark. In addition to this they must take out a licence for themselves if they intend to drive, or for any servant or member of their household whom they intend to permit to drive the car on occasion. People who are not possessors of cars, but occasionally have an opportunity of driving them, will also have to apply for licences as drivers.

The fortunes of THE AUTOMOTOR JOURNAL have been affected by the general progress of the automobile world to at least as great an extent as other branches of the industry. Its circulation has continued to increase at a greater rate than ever before, it has continued to find its way more and more into out of the way parts and corners of the world, and it has been enabled to enter even more fully than formerly into the closest touch with all the leading manufacturers, private automobilists, and those interested in the movement from the point of view of sport, and consequently to become an increasingly comprehensive record of all features and aspects of the movement.

We venture to think that part, at any rate, of this increasing prosperity and increasing influence is due to the absolutely independent manner in which we have supported what we believe to be the true interests of the automobile movement, and have advocated everything which we have regarded as likely to promote them, without considering in any way whether we were incurring the hostility of persons or bodies powerful in the automobile world or not. In this way we have been brought, on certain questions, into a position of some opposition to the Automobile Club and others, but we believe that such criticism as we have felt called upon to offer on various points has not been without effect. We look forward to an early general change of policy on the part of the club, and a reversion to the general attitude which enabled it to confer such signal services on the automobile movement in the past. Should this anticipation be fulfilled it is needless to declare that we shall be but too anxious to have an opportunity of again according to the Club the hearty all-round support which we have always afforded it since the time of its foundation. Only its recent misconceptions of the proper functions of such a body, and a regrettable want of diplomacy in its deliberations, have compelled us to express disapproval.

As already stated, we are convinced that the tide of popular opinion has turned in favour of automobilism. We have every reason, therefore, to believe that the Act which now comes into force will be administered in a fair and reasonable spirit and not in the prejudiced, carping, vindictive, and often un-English way which has so frequently tarnished the administration of the Act of 1896. We believe this is the more likely to be the case, as the new Act will certainly be successful in abolishing that terror of the roads and *bête noir* of other automobilists, the "road hog." He will be wiped out at once, and when he is abolished we feel convinced that popular opinion will incline still more in favour of the new locomotion, and as in this country no statute can be long administered in opposition to the views of the majority of the people, we shall have fewer police traps, fewer unfair decisions, and progress and prosperity will follow as a matter of course.

Automobilists have their work cut out for them. Their one main object must be to do everything they can, by tactful consideration for other users of the roads, to deprive any enemies of the movement that may be left of the smallest excuse for urging the authorities to make repressive use of their new powers. By the same course of action they will show that some of the features of the Act which we most criticised at the time it was passed—notably the speed limit—are superfluous, and if they succeed in doing this, there is every reason to trust that when the Act comes up for review and re-casting, these and other unpleasant provisions will be repealed.

Further Proposed Regulations by the L.G.B.

THE regulations made by the Local Government Board, with which we previously dealt, referred to the questions of registration and licensing. The Board have now sent round to the leading bodies interested in the automobile industry a draft of the regulations they propose to issue under the other provisions of the Act. These are, of course, at present only suggested, and are liable to modification, so that although they have found their way into the columns of some of our contemporaries, we do not propose to reproduce them in detail. Like the former order, the proposed regulations exhibit the spirit of fairness and consideration for the new industry which has characterised all the actions of the L.G.B., and one is thankful to be able to say that it is proposed to deal with the trailer question in such a way that prejudiced magistrates will no longer be able to fine a motor bicycle and trailer for going at more than six miles an hour. The Board propose to restrict the use of unduly bright lamps calculated to dazzle, annoy, or impede other persons on the road.

There are several points in regard to the proposed regulations, however, which we would be glad to see amended, and as the object of the Board in submitting them to the consideration of automobilists is in order to learn their views on the subject, we express our views on these points in the hope that the Board may see its way to adopt the modifications we suggest. First and foremost amongst these we would refer to the regulation that a motor car is to be stopped at the request of any person having charge of a horse. In the similar regulation made under the old Act, the word "restive" was introduced before "horse," and that certainly, we would respectfully submit, ought to be done in the present case. Otherwise any virulent anti-automobilist who is the possessor of a horse or who can hire, borrow or otherwise procure the use of one, will have it in his power to stop all the automobilists he likes. It is also required that the car driver shall stop his engine when he brings the car to rest for the purpose of letting a horse owner by. This, we suggest, is wholly unreasonable. The most that can be asked for is that he should stop his engine if unusually noisy, and if specially asked to do so. Further, the right to stop a car is conferred not only upon the driver of a horse-drawn vehicle, as in the old rules, but on *anybody* in it if he holds up his hand. This, no doubt, has been introduced because rather unfair capital has been made out of the old regulations that only the driver of the horse has a right to stop an automobile by holding up his hand, but we think, at any rate, that the words, "at the request of the driver, in the event of the driver being unable to do so," should be inserted in this passage.

As regards the prohibition of excessively brilliant lights "to the danger, annoyance, or impediment" of any person, the Board obviously had in view screening or veiling the lamps when passing other vehicles or in thick traffic. It ought, we think, to be made clearer that this is what is intended, and not the prohibition of mere brightness which on open country roads is essential for rapid travelling at night. The words "annoyance" and "impediment" ought also to be left out of this regulation, otherwise any irascible old gentleman standing on his front door-step, or at any rate opposite his house, will be able to say that he is very much annoyed by the brilliant lights of his neighbour's automobile (with whom perhaps he is at feud), and might institute proceedings. Mere "annoyance" or "impediment" are much too indefinite terms to be introduced into a regulation of this kind.

Another provision which appears to us very superfluous is that which provides that cars must not be driven backwards for a greater distance than is requisite for purposes of safety either to the occupants of the car or other persons on the highway. A motor car may very easily be driven down a *cul de sac* in which it is practically impossible to turn. If the driver gets out of it by driving backwards, he may, if this regulation stands, be subject to penalty (and penalties under the Act are severe). We do not see that there is any inherent objection to driving cars backwards for considerable distances. It is sometimes very useful to be able to do so, but it is not a thing that drivers are likely to do for the mere fun of the thing, so that we would submit that this regulation might, with advantage to everybody, be omitted.

A more important point concerns the great question of public service vehicles. The regulations propose that automobiles weighing unladen more than two tons shall not be driven at a greater speed than 8 miles an hour. If automobile 'buses are to be built of any size they will often weigh more than two tons unladen, and a 'bus that was restricted to a maximum speed of 8 miles an hour would not be able to keep up an average pace from point to point of more than 5. For vehicles of this kind the maximum speed certainly should not be put at less than 12 miles per hour.

The Local Government Board have throughout displayed so reasonable an attitude, and are obviously so anxious to administer the new Act, as far as possible, to the benefit of the industry, that we feel convinced that as soon as these obvious objections to their proposed regulations are put before them, they will effect these modifications which are so necessary if the development of the motor car industry is not to be seriously hampered.

As a further illustration of the progressive and unprejudiced attitude of the Board, we would refer to their recent action in regard to the 10-mile limit question. It is a proof that the Board is perfectly willing to accept a reasonable suggestion from whatever source it may originate. In November last the Automobile Club communicated with the Local Government Board, suggesting that in all cases in which local authorities desired to apply the 10-mile limit the fact should be advertised in the *London Gazette* and in the local papers. The Local Government Board have now replied, explaining that the Board have determined to adopt the suggestion, and state that they will settle a form for the necessary advertisement, and fix a time within which objections to the application may be lodged at the office of the Board. Every objector will at the same time have to forward a copy of the objection to the clerk of the local authority.

Measuring for Sixteen-Foot Roads.

AN amusing side-light is thrown upon the shifts, subterfuges, dodges, and stratagems of anti-automobilist local bodies, particularly in the Highlands, by some correspondence which has been appearing in the *Dundee Courier*. The Forfar District Committee wanted to get as many roads as possible prohibited under the 16-foot clause of the new Act. After the reception of the Local Government Board Circular and Order, explaining that 16 feet meant 16 feet between the hedges, the District Committee had a careful survey of their roads made, straitly charging the service men to measure only between grass and grass, so as to make out as many roads less than 16 ft. as possible. These tactics did not succeed, for the County Council refused to ratify them, but the correspondent of the *Dundee Courier*, who had drawn attention to this little hole-and-corner attempt to prejudice the interests of automobilists, raises an interesting question. He points out that according to the old Highway Act of William IV., two justices have the right to order the widening of any highway that is too narrow, and to make it at least 30 feet wide. We should like to know whether they are delegated to the District Councils. Perhaps some of our legal readers can tell us. The matter is of some interest, as if the powers still subsist, automobilists might be provided with means of locally putting on the screw. The powers conferred on the justices in the old Act seem to us of doubtful value, as they are so restricted by not being permitted to "pull down any house or building, or take ground from any garden, lawn, yard, court, park, paddock, planted walk, plantation, avenue, or nursery for trees," that there are few cases in which it would be possible for them to widen roads except bitwise. In any case the subject wants clearing up in the interests of automobilists. It is essentially one to which the legal gentlemen who have come so much into notice through the automobile movement might devote their attention with advantage.

THE Surrey County Council have decided not to schedule any of their roads, under the new Act, for the restriction of speed.

KEEN competition amongst the public has so far attended the appearance of the two or three petrol motor hansom cabs which are now plying for hire in the London streets. They are so far proving a remarkable success, and a significant sign of the times is that the drivers of horse drawn hansoms are, with very few exceptions, inclined to regard the innovation seriously, and refrain from greeting them as they pass with the derisive jeers which a year or so back would have been their reception. Attempting to obstruct their passage is not even thought of. In the early days of the electric cabs we have frequently seen a mechanical vehicle held up by a couple of hansom cab drivers for a considerable distance.

THE SPYKER PETROL CARS.

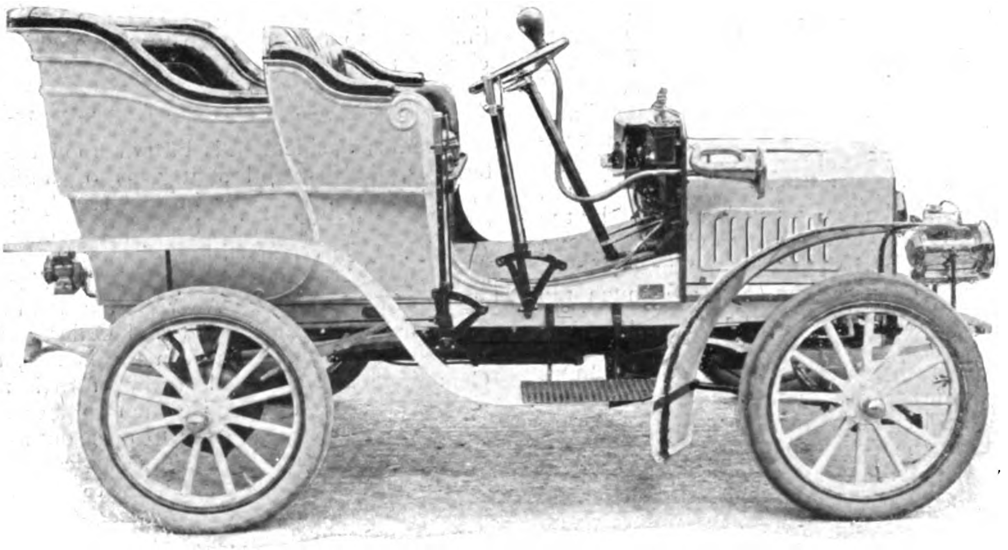


FIG. 1.—A 10-h.p. Twin-Cylinder Spyker Petrol Car.

THE vehicles made by Messrs. Spyker Brothers at Amsterdam, which differ in many interesting respects from other cars now on the market, were first brought prominently before the British public in the Reliability Trials. The latest models were shown recently at the Paris Exhibition, when an additional interest was lent to the Company's stall by the presence of a 6-cylinder racing car built by them, which may compete for the Gordon-Bennett Cup. Four types of standard touring vehicle are now being made, the smallest of these having a twin-cylinder 10-h.p. engine and the others having 4-cylinder engines of 12–16, 16–20, and 20–27-h.p. respectively.

Three views of the 16-h.p. chassis are given in Figs. 2, 3, and 4, Fig. 2 being a side view from the right, Fig. 3 a similar view taken from further forward, and Fig. 4 looking down upon it from the rear; in Fig. 3, one of the cylinder castings for the engine is also shown separately in one corner. The special features of the Spyker cars relate to the main frame, which is of pressed steel and forms a cover round the engine and gear-box, to the engine, which has cylinder castings of unusual shape, to the gear-box, which is made in one piece but has a large readily detachable cover, to the steering gear, which is fitted with ball bearings and has the steering pillar hinged and connected by a spring with the frame, and to the front axle, which is tubular and is provided with spherical joints for the stub-axles, about the steering heads.

The side members of the main frame have a ∩ section, the inner face of which is prolonged and curved inward and downward, in front, around the engine and the gear-box. These side members are filled with wood, and are connected together by four transverse members. The frame is supported upon four semi-elliptic springs mounted outside it, as seen in Fig. 2, and the rear ends of those above the back-axle are carried by an inverted transverse spring passing across beneath the rear member of the frame and attached centrally to it. The car is of the live-axle type, and the revolving portions of the axle are enclosed in a stationary casing. The front axle, which is tubular, terminates in two semi-spherical cups, which, together with their covers, form ball and socket joints around the steering heads. The stub-axles are otherwise connected with the stationary axle, in much the usual way, by a vertical pin which is free to turn concentrically with the ball-joint on a tool-steel pivot at the top. The levers project from the lower end of the steering-head, and the usual rods connect them together and with the steering gear. The axle itself is bent to a U-shape at its centre.

The steering gear consists of a neat casing, into which the steering pillar passes; the lower end of the pillar-shaft has a machine thread cut upon it, and the large nut, which rides upon this thread, forms a toothed rack, which engages with a pinion on the horizontal shaft to which the lever connected with the off-side steering head is attached. The screw and nut render the gear irreversible, and the pillar is attached to the casing enclosing the gear by an eccentrically-mounted bearing, so that back-lash between the rack and the pinion can be taken up. The horizontal shaft has ball bearings, and the entire casing is cast solid with a sleeve, which forms a hinge for it about a pin fixed to the main frame. The steering pillar is thus free to move sideways about the hinge, but it is normally held in its central position by a strong spring, formed by a bent bar of spring steel. This flexible attachment to the frame is intended to prevent vibration from being transmitted to the driver's hand, and any such movement as it may make about its pivot does not affect the steering.

Each pair of cylinders is formed by a single casting, which has a circular exterior, providing a very large water

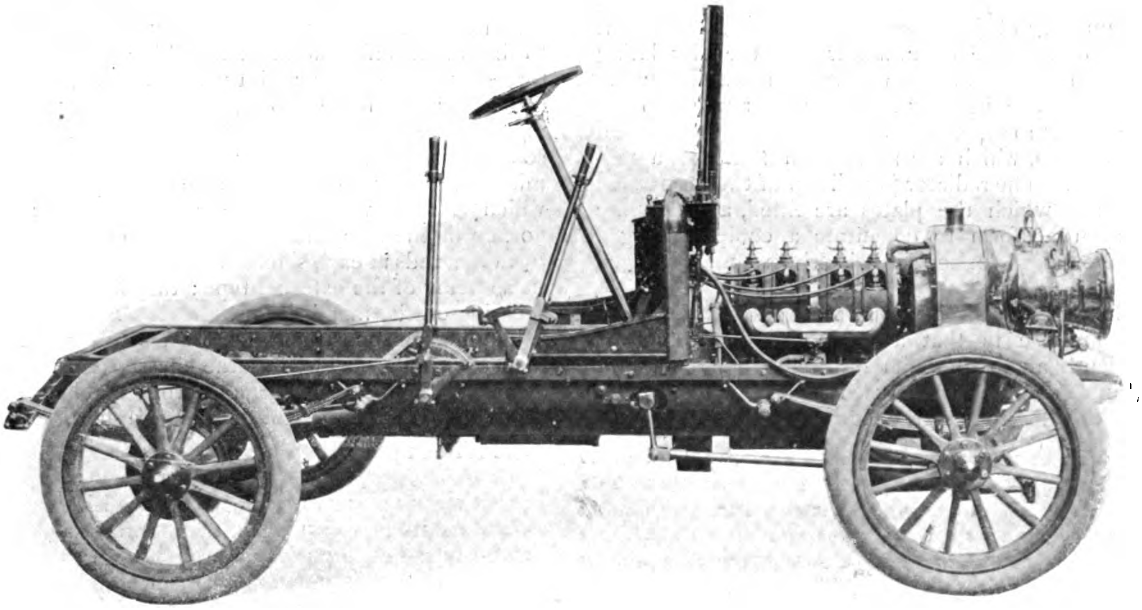


FIG. 2.—Side View of the 16-h.p. 4-Cylinder Spyker Chassis.

jacket about the cylinders themselves and the valve chambers. These castings are open at each end, where they are flanged for making the necessary joint between each pair of cylinders, and for receiving the end covers. This form of construction gives the engine very much the same appearance as an iron-clad electric motor, this effect being still further emphasised on the chassis by the four wires passing to the four ignition plugs on the one side. The cylinders themselves, and the valve chambers are of practically the same shape as usual, as will be gathered from Fig. 3, mechanically-operated inlet-valves being fitted on the one side and the exhaust-valves on the other. Inspection plugs are arranged above each of the valves, and the high-tension ignition-plugs fit into those above the inlets. In the 16-h.p. engine, the water-jackets have a capacity of about 6 litres; the inlet-valves lie on the right, the exhaust-valves on the left. Half-compression cocks are arranged centrally in the heads of each of the cylinders, serving the usual additional purpose of allowing paraffin to be introduced when necessary for cleaning the pistons. The lower portions of the cylinder castings are provided with flanges for bolting them down in the usual way to the upper portion of the crank chamber. This upper portion is bolted direct to the main frame, and is so arranged that the crank-shaft bearings are attached to it and are independent of the base-plate, which can therefore be removed at any time for inspection or adjustment of the moving parts. The two cam-shafts which operate the valves are enclosed in the

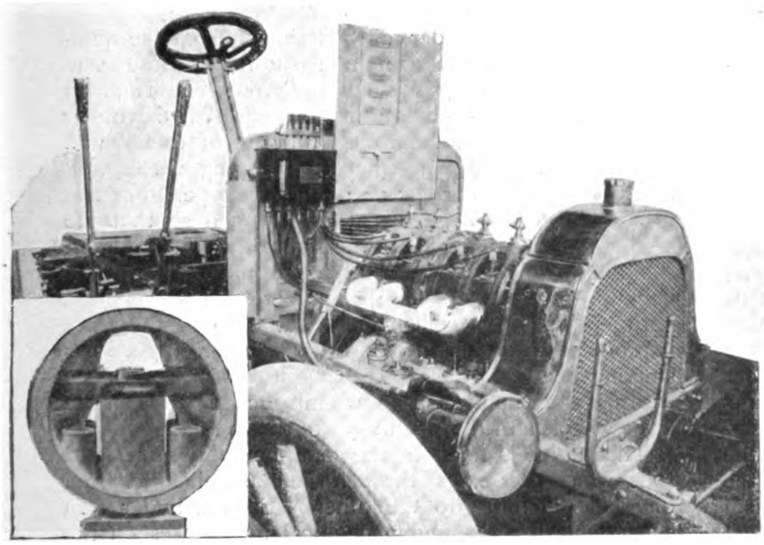


FIG. 3.—The 16-h.p. Chassis from in Front, with a View of a Cylinder Casting in the Corner.

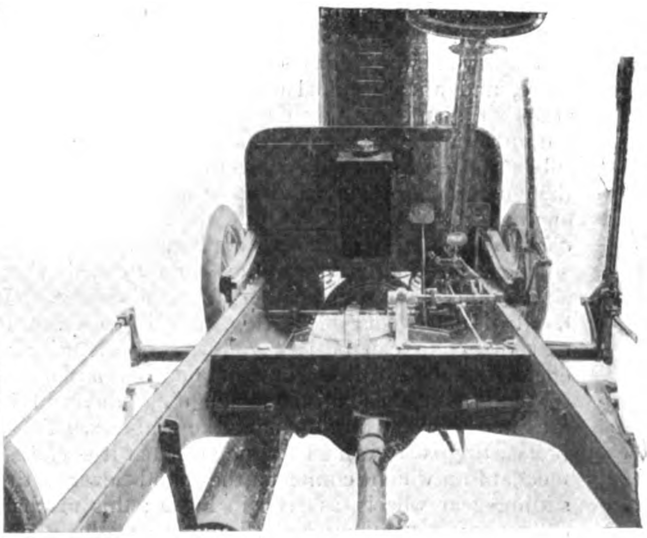


FIG. 4.—A Portion of the 16-h.p. Spyker Chassis from Above and Behind.

crank-chamber, and their forward ends project a sufficient distance to carry the commutator and the circulating pump, which are fitted right in front of the frame beneath the radiator. The radiator has the appearance of being of the honeycomb type, though it is in reality constructed of finned tubes, which are masked in front by a perforated plate. The radiator is built-up of twelve parallel tubes, around which the plates are fitted, and they are bent serpentine form to constitute a cooler having a very large exposed surface; a belt-driven fan is arranged behind it.

The high-tension ignition system only varies from ordinary practice in that a single trembler, which is independently actuated by its own electro-magnet and is fitted in a separate case, is used for all four coils; the commutator distributes the low-tension, intermittent current to the coils, and their high-tension terminals are permanently connected with the ignition plugs—this arrangement being apparently similar to the well-known Wilson and Pilcher system. An automatic carburettor is employed which has a spring-loaded auxiliary air-valve, and an additional throttle-valve controlling the main air supply connected with the throttle-valve in the induction pipe. These throttle-valves are not only subject to the usual hand-control but are connected with the clutch and brake pedals, so that the speed of the engine is automatically reduced when the clutch is disengaged or when the brake is applied.

The main clutch is of the cone type, having an aluminium cone with leather friction surface. It is fitted with an adjustable spring, and is so constructed that the cone can be removed without disturbing the engine or the gear-box. For this purpose, and in order to render the mechanism self-aligning, universal joints are fitted between the clutch and the gear-box. The gear-box casting is so formed at one side that it encloses the mechanism which connects the hand lever with the sliding gear wheels, as seen in Fig. 4; this mechanism does away with the usual sliding rods which project through the casing. It also has a large oil-tight cover on top, so that it is rendered practically dust-proof. The cover is held down in place by a large flat spring, which engages with catches at either end, but enables it to be lifted off in a moment. The gearing provides three forward speeds and a reverse, and gives a direct through-drive on the top speed. The gear wheels are made of hard steel, are specially cut, and are not subsequently hardened. The propeller-shaft, which transmits the power to the live axle, is enclosed in a tube which is rigid with the casing forming the stationary portion of the axle, and the axle is also tied to the frame by radius rods at each side. The usual brakes are fitted, these being of the external type; they have bronze shoes pressing on the metal drums.

The makers construct their own artillery wheels and their own bodies, as well as the chassis itself, and make a special line of the carriage work. Their standard shape this year is the Roi de Belge, and they are using Indian tree bark, and other light materials instead of aluminium, as they consider that bodies so constructed are less liable to sustain damage.

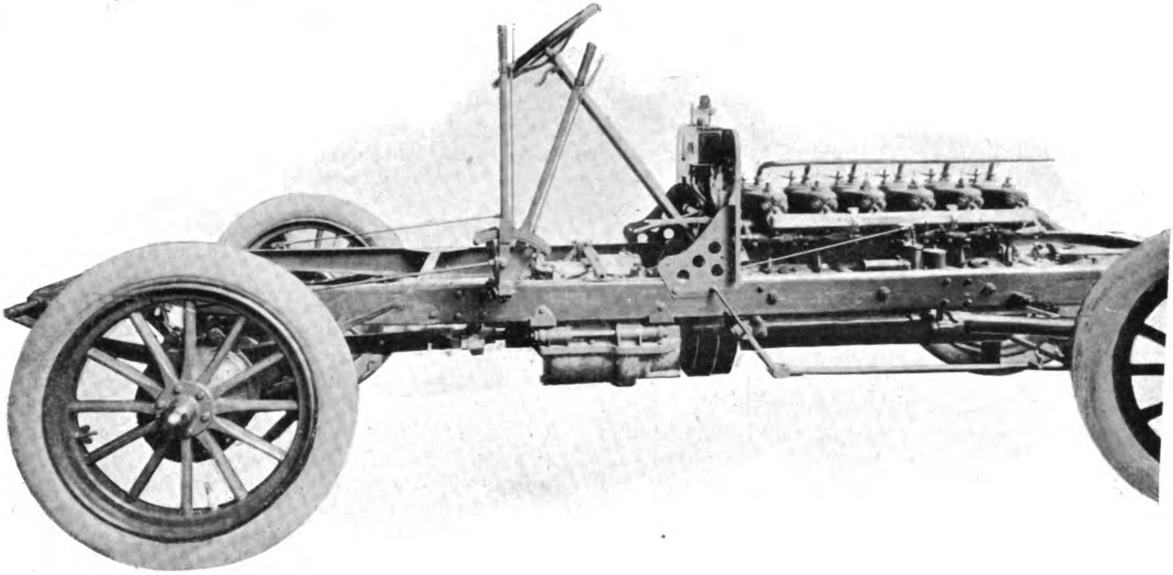


FIG. 5.—Side View of the 80-h.p. Spyker Racer.

The Spyker 6-cylinder racer is shown, from the right-hand side, in Fig. 5, the engine is shown from the same side in Fig. 6, and a view of the front axle is given in Fig. 7. Apart from the employment of a 6-cylinder engine, the most notable characteristic of this 80-h.p. machine is that all four wheels are driving wheels, and that therefore both axles are of the live type. For this reason the change-speed-gear is arranged so that the second-motion-shaft lies to the right of the first-motion-shaft, and two propeller-shafts pass from it, forward and backward, to the two axles; one differential gear is fitted between the two propeller-shafts, and each of the axles is provided with its own differential. The front axle has steering heads of the Spyker spherical form, concentric with which are universal joints introduced between the front wheels and the two halves of the live axle.

The engine is fixed to the main-frame by four steel rods, which pass across through the crank-chamber from one side member to the other. Each cylinder is a separate casting, having mechanical inlet-valves on the one side, and the exhaust-valves on the other. A high-tension ignition system is adopted, and an automatic carburettor employed. The main-frame is constructed

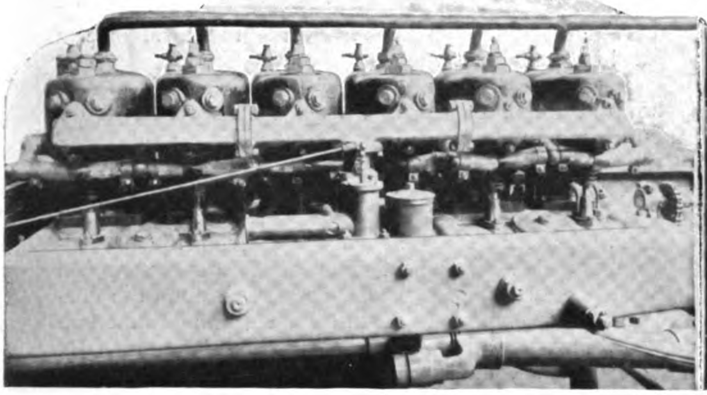


FIG. 6.—The 6-Cylinder Spyker Engine, from the Right Side.

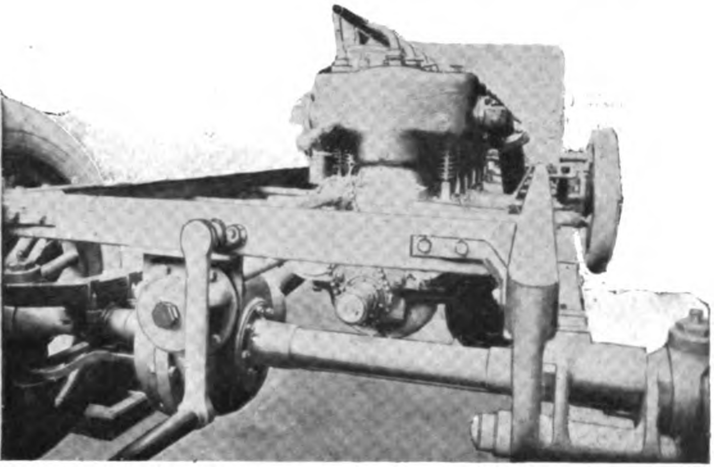


FIG. 7.—Front View of the Spyker Racer, showing the Live Front Axle.

of pressed steel, the semi-eliptic springs are arranged outside the frame, and the car has a very long wheelbase. The crank-shaft for the engine is a solid forging, and the crank-pins are set at an angle of 120 degrees from each other for each set of three cylinders. The crank-pin for No. 1 is in line with the crank-pin of No. 6, the pins for Nos. 2 and 5 are in line with one another, as also are those of Nos. 3 and 4.

The English agents for the Spyker vehicles are the Ellsworth Automobile Company, of Bradford.

AUTOMOBILISM IN SOUTH AFRICA.

(From our Special Correspondent.)

Cape Town, Dec. 8th, 1903.

THE A.C. of South Africa held a most successful club run last Saturday from Cape Town to Durbanville. Greenmarket Square was the rendezvous, and the following cars were lined up on that spot, and left for Durbanville:—Messrs. Irving and Hennessy, 7-h.p. Panhard; A. C. Fuller (club sec.), 14-h.p. New Orleans; J. G. Rose, 7-h.p. Panhard (Hon. J. D. Logan's car); E. Edwards, 7-h.p. Panhard; H. Edwards, 7-h.p. Panhard; J. de Klerck, 7-h.p. Panhard; H. L. Steyn's 12-h.p. De Dion, driven by Mr. Donald Menzies (of the Dunlop Motor Company, Limited, Cape Town); S. H. Adams, 10-h.p. Lanchester; A. C. Partridge, 10-h.p. Lanchester; Heusschen, 10-h.p. Benz; W. M. Jenkins, 6-h.p. Rambler; C. Freeman, 6-h.p. De Dion; Sid. Benjamin, 6-h.p. De Dion; Fallon, 6-h.p. De Dion; E. G. White, 5-h.p. Oldsmobile; H. Loton, 5-h.p. Oldsmobile; J. Delpont, 3½-h.p. Renault; B. Langley, 10-h.p. Georges-Richard; Jones, 6½-h.p. Gladiator; C. Mills, 10-h.p. Wolseley; Herold, 6½-h.p. Gladiator; Porter, 6-h.p. De Dion; Beekman, 5-h.p. Baby Peugeot.

Mr. Fuller's New Orleans was driven by Miss Randall, whose consummate skill in handling the car caused considerable admiration. She was the first lady to drive a motor out here, and as a fearless but careful chauffeuse she is widely known.

On arriving at Durbanville the club took tea at the International Hotel. A special general meeting had been convened to take place at Durbanville, and, after the transaction of the usual business, two more Vice-Presidents were elected, they being Dr. L. S. Jameson and Mr. D. P. de Villiers Graaf.

On the return journey to Cape Town, Mr. Heusschen, driving the "ten" Benz, met with a nasty spill at the seventh milestone. In swerving sharply to the side of the road to avoid colliding with a wagon, which he had been unable to see owing to the heavy cloud of dust raised by the cars in front, his car had a bad side-slip, and capsized on the side of the road. Mr. Heusschen sustained a dislocated shoulder, but the car was uninjured, and, after having been righted, was driven into Cape Town.

IT is impossible to avoid a smile at the expense of a German contemporary, on finding in its pages, in connection with the Gordon-Bennett Club delegates, Mr. Gray Dinsmore raised to the peerage, and solemnly set forth in print as "Lord" Gray Dinsmore. The transmogrification of Mr. Julian Orde into "Alexander Order" is hardly less striking, though how the correspondent should have jumped from Julian to Alexander is not easy to see. Mayhap he was thinking of Alexander Winton, or was it his historical knowledge that befogged him, remembering that both Julian and Alexander were somewhat celebrated rulers in their day?

Motor Coaches for Scotland.—The coming summer will witness the adoption of motor tourist coaches on one of the most charming and popular of routes in the Scottish Highlands. The Great North of Scotland Railway have just placed an order with Stirling's Motor Construction Company, Limited, of Edinburgh, for several 20-h.p. motor omnibuses of special design for delivery in March, to run, it is understood, between Ballater and Braemar. The coaches will accommodate sixteen persons and luggage, and have speeds from four to fourteen miles an hour.

THE PRUNEL AUTOMATIC CARBURETTOR.

Now that automobile engineers are so keenly alive to the importance of rendering carburettors automatic in action, so that the richness of the mixture formed in them shall remain constant at all times, it was only to be expected that a large number of new types would make their appearance on the market. Notwithstanding this, however, it is remarkable that so many of these new carburettors differ radically in the principle which has been adopted for rendering them automatic. Many of them have followed more or less upon the Krebs and Crouan lines, by varying the amount of auxiliary air which is admitted to the mixing chamber to dilute the explosive mixture already formed by the passage of the main air supply through the carburettor proper. Several other ingenious systems, however, have been adopted by other makers, and in some of them the flow of petrol through the spray jet has been varied automatically instead. The Prunel carburettor is based upon this principle, the idea being to prevent the mixture from becoming over-rich when the engine is running fast by causing the increased volume of air which then passes through the carburettor to have a lessened injection effect upon the spray jet.

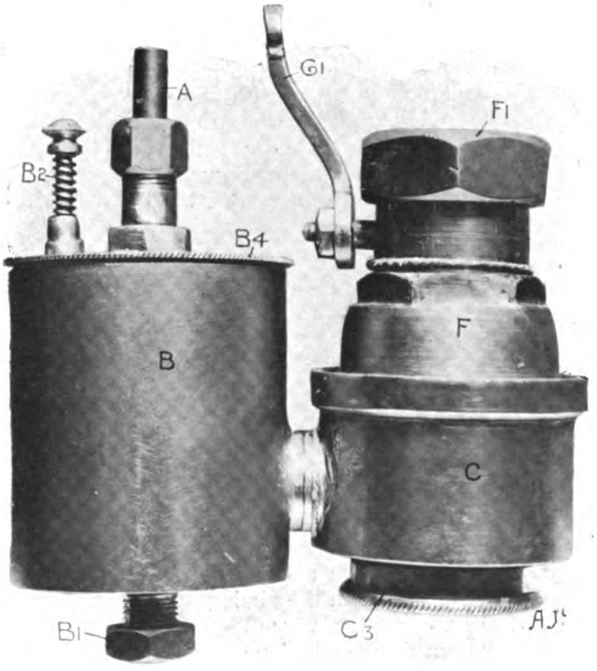


Fig. 1.—The Prunel Automatic Carburettor.

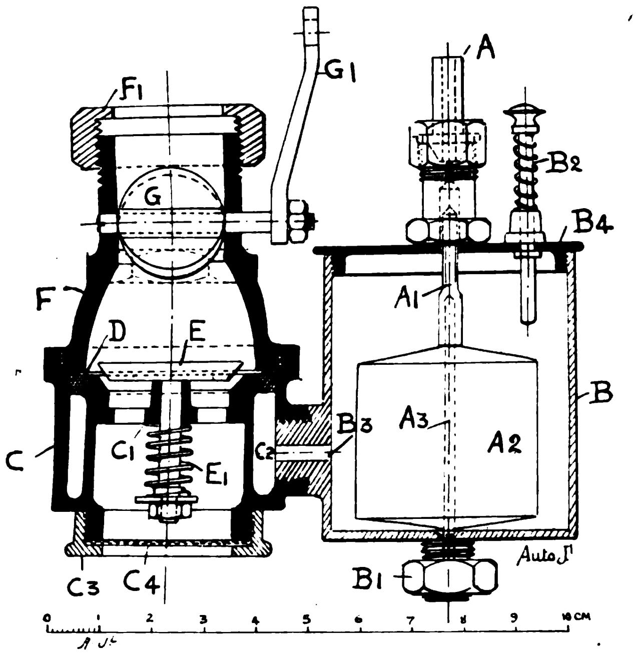
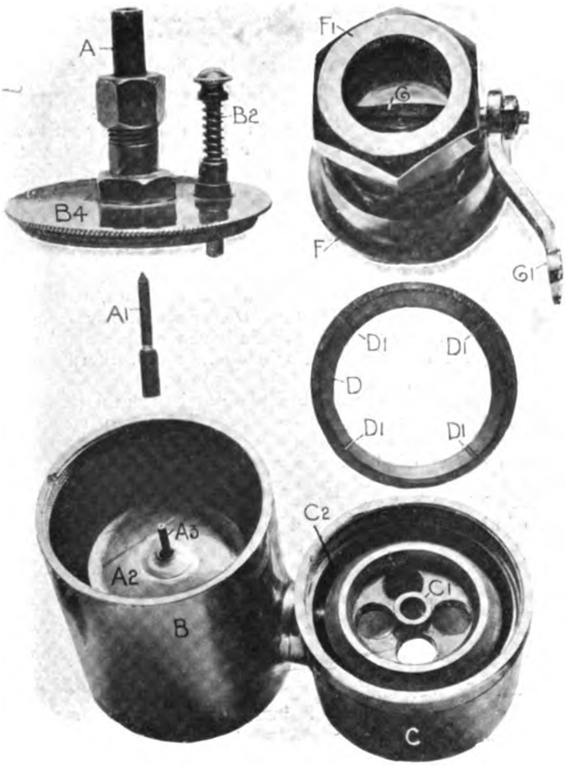


Fig. 2.—Cross-Section of the Prunel Automatic Carburettor.

Our illustrations show one of the small bicycle type carburettors recently brought out by the Prunel Company. It is shown complete in Fig. 1, taken to pieces in Fig. 3, and by a sectional drawing in Fig. 2. The petrol is led by the pipe, A, into the cover, B^4, of the float-feed-chamber, B. Its flow into the chamber is controlled by the needle, A^1, which is free to slide over the pin, A^3, which also acts as a guide for the float, A^2. The needle, A^1, therefore, normally rests upon the float, so that the level of the fuel in the chamber, B, is kept constant in much the usual way. The base of the float-chamber is formed with a stud and nut, B^1, at the bottom for fixing the carburettor in place, and the cover plate, B^4, is provided with the agitator, B^2, for allowing the float to be depressed by hand for raising the level of the petrol to facilitate starting.

The mixing-chamber, C, the shape of which is clearly shown in the illustrations, forms a central guide, C^1, for a small mushroom valve, E, a circular seat for this valve, and an annular space, C^2, which constitutes a kind of jacket in the casting. The base of the mixing-chamber, C, is fitted with a cap, C^3, which holds a sheet of wire gauze, C^4, in place, so that the air entering the mixing-chamber passes through it. The valve, E, is so arranged that it normally closes the air passage through the mixing-chamber, being held down on the seating formed in the casting, C, by the light spring, E^1. The hole, B^3, connects the annular jacket, C^2, with the float-feed-chamber, B, so that the petrol is free to flow into the former, and the top of this annular space is closed by the ring, D, which is internally shaped like a valve-seat, and fits down upon a corresponding surface on the casting, C. Four grooves, D^1, are cut across the valve-seat, and these act as a spray nozzle, through which the petrol can flow into the cover, F, of the mixing-chamber. The ring, D, is held down in place by the casting, F, which screws into the top of the casting, C.

The whole of the air enters the carburettor through the gauze, C^4, passing out at the top of the casting, F, to the induction pipe, which is held in place by the union, F^1. On its way through the carburettor it lifts the valve, E, off its seat, and in rushing past the valve it injects the petrol through the slots, D^1. The quantity of explosive mixture thus formed, which finds its way to the engine, is regulated by the butterfly throttle-valve, G, which is fitted into the casting, F, and is regulated by hand, by the lever, G^1. The extent to which the valve, E, is lifted off its seat depends upon the degree of vacuum which is formed in the chamber above it by the suction of the engine, and consequently it is lifted to a greater extent when the engine runs fast, and to a lesser extent when the throttle-valve is closed. It is at these times when the mixture tends to become over rich in a non-automatic carburettor, and it will be noticed that in this device the injection action of the air on the petrol decreases as the quantity of air passing through the carburettor increases, because the valve, E, in lifting, provides a very much larger annular space between it and its seat, and therefore allows the air to pass almost equally freely besides letting it do so further away from the spray jets. Provided that the spring, E¹, is properly adjusted, and has the correct strength at all points, and provided also that the proper level is arranged for in the float-feed chamber, the richness of the mixture formed in the Prunel carburettor should remain approximately constant under all ordinary working conditions of the engine.



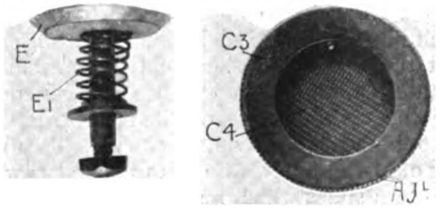


FIG. 3.—The various Parts of the Prunel Automatic Carburettor.

VARIOUS awards of prizes are announced in connection with the Paris Salon which closed on Christmas Day. In the judging of the most tastefully designed and finished cars exhibited we are glad to chronicle the honour of a silver gilt medal to the Napier Company, whilst other English firms also receive due acknowledgment of the excellence of their vehicles. The Wolseley Tool and Motor Car Company, the M.M.C., and the Elswick Motor Company all receive bronze medals, and in the Electric Section the Electromobile Company are awarded a silver medal. *The Car* have received a silver gilt medal in the Sporting Publications Competition for foreign countries. Amongst the other well-known makes receiving due honour, the Pipe car and the Bayard (Clement) receive silver medals, bronze medals being awarded to the Fiat, Clement, and Gladiator. Serpollet in the steam section carries off the silver gilt medal, and Chaboche the silver. For pneumatic tyre inflation apparatus, M. De Dietrich, with the Girip apparatus, secures the first prize. MM. Gautreau Freres, of Dourdan, are at the head of the list for carburettors which most readily adapt themselves to the use of either petrol, heavy oil, or alcohol. For the decoration of the stands, both the Electromobile Company and the Oldsmobile Company obtain silver medals, and bronze medals are awarded to the Wolseley Tool and Motor Car Company, the M.M.C., and the Elswick Motor Company. In the exhibition lottery, the three big prizes have been drawn as follows:—(1) 6-h.p. De Dion-Bouton 4-seated Populaire Car, Ticket No. 112,171; (2) 5-h.p. 4-seated Georges Richard Voiturette, No, 7,615; (3) A complete bed-room suite by Defayel, No. 269,202. This latter has fallen to M. Louis Clerc, the second to M. Depardieu, a medical student, and the first to M. Odent, a merchant.

A PRACTICAL test is now being given by the Philadelphian postal authorities to a scheme for transporting the mail matter from the General Post Office, the Bourse, and the two principal railroad stations by means of automobile. It is to be tested for eighteen months from November last, this arrangement following preliminary tests, which proved exceptionally satisfactory; in fact, it is stated that the work done by the test car proved that one motor vehicle performed the services of two horses and wagons and two mail collectors in the time consumed by one horse and wagon over one half the trip. It is estimated that seven automobile mail vans could perform better service than twelve horse-drawn collecting wagons, besides requiring the services of five men less. This innovation does not necessitate the purchase of additional vehicle bodies, as it is based on an electric motor tractor system. The tractor, which has been developed by Rudolph Hunter, of Philadelphia, and is built by the Electric Vehicle Equipment Company, is very easily placed in position for drawing the mail cart body.

IN Italy also prolonged experiments are to be inaugurated for the postal service between Rome, Morlupo, and Rignano. This test will be exceptionally severe, as the roads are extremely bad, and at times almost impassable. Besides carrying the mails, the service will be arranged to accommodate ten passengers upon each run. The formal inauguration of this service was to take place on the 1st of January.

THE King of Italy has announced his intention of bestowing his patronage upon the Italian Automobile Club, commencing with the New Year.

THE EDISON BATTERY—DETAILS OF CONSTRUCTION.

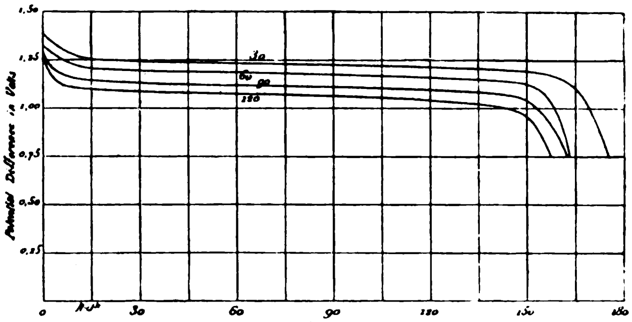
GENERAL interest in the Edison battery continues unabated. A variety of papers have been written, and tests made, giving the performances of the element as tested by various observers. With Mr. Hibbert's paper on the new battery, read before the Institute of Electrical Engineers, we dealt the week before last. We have had an opportunity of making several tests of one of the sample Edison cells ourselves, and now M. Hospitalier, of Paris, the well-known battery expert, to whom a cell has been entrusted for examination, publishes in the *L'Industrie Electrique* a summary of his results. With these and our own confirmatory results we will deal later. We propose for the moment to devote our attention to the constructional details of the new cell. Most of our readers are familiar with its capabilities, but probably a great many of them are not so familiar with the manner in which it is constructed. The main features of its arrangement were well illustrated by Mr. Hibbert when discussing his paper at the Institute of Electrical Engineers by a number of lantern slides which permitted the general arrangement of the cell, and the detailed construction of the plates, to be very clearly understood. Thanks to the kindness of Mr. Hibbert, who has provided us with prints of the lantern slides which he exhibited on that occasion, we are enabled to give our readers the main details of construction of the Edison battery.

Everyone is aware that the containing vessel is a particularly compact and rigid structure of corrugated steel. How rigid and compact it is they will be able to see from Fig. 1, which gives a view of the complete 200 watt-hour element, weighing in the case of the cell which Mr. Hibbert examined 17¾ lbs., and in the case of the cell which we ourselves had an opportunity of testing, 17 lbs. 7 oz., each particular cell varying slightly in weight from its fellows. The external appearance of the battery is very pleasing, being constructed of sheet steel, the upper three-quarters of which is corrugated as seen, the whole being nickel-plated by a process forming the subject matter of one of Edison's American patents. In this process, after the coating of nickel has been applied to the surface of the steel plate by electro deposition, the whole plate is heated in a reducing atmosphere to the point at which the nickel and iron weld together, after which the plate is cooled down in the same reducing atmosphere to a temperature at which there is no longer any danger of the iron being oxydised by the atmosphere. The object of this process is to produce an intimate union between the surface of the steel and the nickel of a more perfect kind than is obtained by mere electro deposition so that the plates shall more successfully resist the action of the caustic alkali or electrolyte. It will be understood that the nickel plated steel of which the grids forming the battery are composed are nickel plated in precisely the same way.

The top or cover of the battery, the general appearance of which can be observed from Fig. 1, is shown in detail in Figs. 5 and 6. It forms a separate cover, which is placed over the finished cell, and hermetically soldered to the vertical portion of the cell by means of a special solder also forming the subject matter of one of Edison's American patents. The top of the battery is provided with two ebonite caps, with hexagonal holes, which may be seen rear and front in Figs. 5 and 6, and through these the conical positive and negative terminals of the battery project, and are hermetically locked by ebonite collars screwing down upon them. The orifices, right and left, are respectively provided for permitting the escape of gas, and to enable distilled water to be fed into the cell when, after a certain length of time, owing to the decomposition of the water on charge, further water must be added to keep up the level of the electrolyte. Nothing but water, it will be remembered, need be added, as the electrolyte itself undergoes no decomposition. In Fig. 6 the cap of the orifice to the right is shown removed. This is provided with a gauze cover and a non-return valve, which is shown in Fig. 6, just behind the orifice. When an evolution of explosive gases takes place on charge, the cell being hermetically closed, the pressure of gas inside the cell soon exceeds the atmospheric pressure, and this non-return valve lifts, and allows the gases to escape through the gauze cover to the outside air. In fact, during charge the valve can be heard to clatter nearly all the time. The gauze cover is provided to prevent the possibility of explosion occurring by the action of ignorant persons approaching the cell during charging time with a naked light, the action of the gauze being the same as in the well-known Humphrey Davy safety lamp. The orifice on the left is closed by a stopper which is maintained in position by a toggle joint, the general arrangement being much the same as is familiar to Londoners in the flasks of Kannenbier, to which they are becoming accustomed. This orifice should only be opened in order to inspect the level of the electrolyte, and to fill up with distilled water if, owing to the reasons explained above, it has fallen below the level of the top of the plates. It should on no account be allowed to remain open at other times, as the caustic alkali is in that case liable to be turned into carbonate by the carbonic acid of the atmosphere, which would have the effect first of all of diminishing the capacity, and subsequently of seriously injuring the cell.

Figs. 2 and 3 show the finished plate and the grid respectively. The grid (Fig. 3) is stamped out of a thin sheet of steel, nickel-plated in the same way as the casing of the cell described above. Into each of the windows or apertures of this grid is fitted—one above the other—twenty-four pockets, Fig. 4, containing the active material. This, as our readers are aware, consists, in the positive plate, of nickel peroxide mixed with flaky graphite, and in the negative plate of spongy iron with a similar admixture. That Edison's talents are mainly mechanical and not electro-chemical, is shown by the method he has adopted for securing the active material in position. It is not stamped or pasted into the orifices in the grid as an inventor familiar with the structure of lead accumulators would have been likely to do. On the contrary, a block of the active material is prepared slightly moistened with the electrolyte of caustic alkali and compressed into a solid block by hydraulic pressure. Each such block is inserted in a pocket or sheath of perforated nickel-plated steel shown in detail in Fig. 4 which practically consists of a perforated box with a sliding lid which in Fig. 4 is seen nearly slid home, but has not quite reached the position in which it completely encloses the slab of active material. When the slab of active material is completely enclosed in its perforated sheath or pocket, the whole pocket is inserted into one of the windows in the grid and secured in position. Each window contains, as already stated, twenty-four of these pockets superposed, in three rows, one above the other. It will be thus apparent that from the mechanical point of view alone the construction of the Edison battery must entail very considerable expense. The battery differs from the ordinary lead cell in the circumstance that it has the same number of positive as negative plates—fourteen of each—and as the electrolyte undergoes no permanent alteration, either during charge or discharge, the plates can be brought very close together, and as a matter of fact are only a millimetre apart.

Mr. Dick, the representative of the Edison Company in this country, has been distributing sample cells to several people for them to test them and convince themselves of what the Edison battery can do. One of these batteries has been submitted to M. Hospitalier, the well-known French battery expert, and he has subjected it to an exhaustive examination, the results of which he has published in the columns of our contemporary, *L'Industrie Electrique*. We have also ourselves had an opportunity of supervising a number of tests made with a battery of the same type. All the Edison batteries at present in this country are exactly like one another in external appearance and in general construction. They only differ slightly in point of weight. Thus the battery tested by Mr. Hibbert weighed 17¾ lbs., that tested by M. Hospitalier

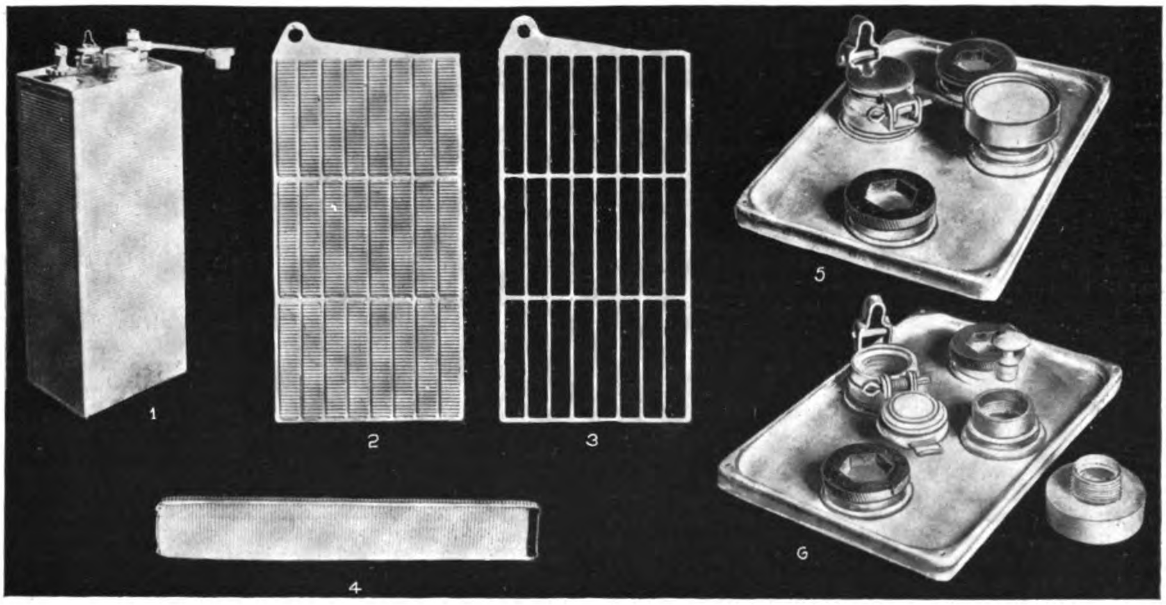


M. Hospitalier's Discharge Curves for Edison Cell.

weighed 7·77 kilogs., and the one that we had an opportunity of examining weighed exactly 17 lbs. 7 ozs. In general the results obtained by M. Hospitalier agree in every particular with those of Mr. Hibbert as published in his paper. We give below a series of curves obtained by M. Hospitalier at various rates of discharge, and it will be seen that the discharge at even as high a rate as 120 ampères gives the same large proportion of the total capacity that characterised the batteries tested by Mr. Hibbert. In fact, M. Hospitalier goes further and declares that according to his tests the battery even when discharged at the enormous current of 200 ampères gives very nearly the same capacity as at ordinary rates. As at this rate it is completely discharged in 40 minutes, and as the total capacity of the battery only amounts to about 160 ampère hours, a discharge of 200 ampères may be looked upon practically as a short circuit. We are able to confirm substantially the accuracy of this result. The cell which we had the opportunity of examining gave at an ordinary discharge rate of 30 ampères 159 ampère hours, which comes out approximately at 200 watt-hours. When discharged at 150 ampères, it still gave 153 ampère-hours, though the watt output was slightly less, as the general voltage of the discharge averaged ·1 of a volt less. These results are altogether remarkable. No battery has ever given so large a proportion of its total capacity at such a high discharge rate, but we are unable to agree with M. Hospitalier that this is an unmitigated advantage. He introduces in his paper some comparative figures which show that a number of light lead batteries, and notably the Contal battery, have considerably higher capacity at a moderate rate of discharge. It is only at enormously high rates that the Edison battery is pre-eminent. For automobile purposes we fail to see, as we have already said, that this is a very great advantage. There may be occasions when it is advisable to run a car at a considerable speed for only an hour or so, and then replace or recharge the battery. Where these conditions arise the Edison battery will out-do all competitors if it maintains its general level of performance. Conditions of this kind might require to be met in the case of submersible torpedo boats or submarines. But in an ordinary electromobile service, four, five or six hours at any rate are allowed for continuous running and at a 5 or 6-hour discharge rate, the Edison battery is not superior to many lead cells, and is inferior to some. As regards life, M. Hospitalier makes some interesting observations. He bases his comparison with lead cells on the competition of accumulators carried out by the Automobile Club of France in 1899. That, of course, is somewhat antiquated, and lead accumulators have made considerable progress since then, but taking those results for what they are worth, it appears that the best lead cell gave 1½ kilowatt-hours per kilog. of cell. According to M. Hospitalier's tests, the Edison battery has already given upwards of 3 kilowatt-hours per pound without any apparent diminution of capacity. If this is generally maintained by commercial Edison batteries, we may say that as regards life the Edison cell bids fair to prove at least twice, possibly three times, as durable as light lead batteries. Against this, however, it must be borne in mind that, in automobile lead batteries, it is practically only the positives that wear out, at any rate, within a considerable time, that the replating of a battery with positive plates can be done for from 10 per cent. to 15 per cent. of its total cost, while owing to the cost of the nickel in Edison battery and its construction, a similar operation in that case would be decidedly expensive. Curiously enough we have now learnt that Edison is now building batteries with double positives. An interesting fact established by M. Hospitalier's tests is that the battery is quite uninjured both by short circuiting and standing in a discharged condition. These are valuable features. A battery was short circuited for 17 hours. After that it was recharged and again discharged, when it failed to give its full capacity by about 25 per cent., but on receiving another charge it came up to its full capacity and has maintained it ever since. Similarly a cell only loses about 10 per cent. of its charge on open circuit in 24 days—a very excellent result. A discharged cell, which was discharged on the 24th of August, was allowed to remain in a discharged condition until the 4th of September, when it received a single full charge, and, on discharge, furnished 155 ampère hours (160 being the average discharge). This is an exceedingly satisfactory result, and is certainly very unlikely to have been attained by a lead battery. The only combination we know in which a similar result could be got is that of Planté positives used with zinc negatives, in which the gradual neutralisation of the acid by the zinc on open circuit prevents sulphation of the positive plate.

The cells which Mr. Dick has distributed in this country and in France have been put together on this side of the Atlantic, and consequently on completion they have to be subjected to forming treatment. The particulars of this process are rather interesting. When the cell is filled up with electrolyte for the first time the directions supplied are that it should be charged at 30 ampères for 30 hours, and then discharged at 30 ampères till the voltage sinks to ·75 of a volt. After that the cell is to be charged at 60 ampères for 10 hours and discharged at 30 ampères. It can then be treated in any way the possessor likes.

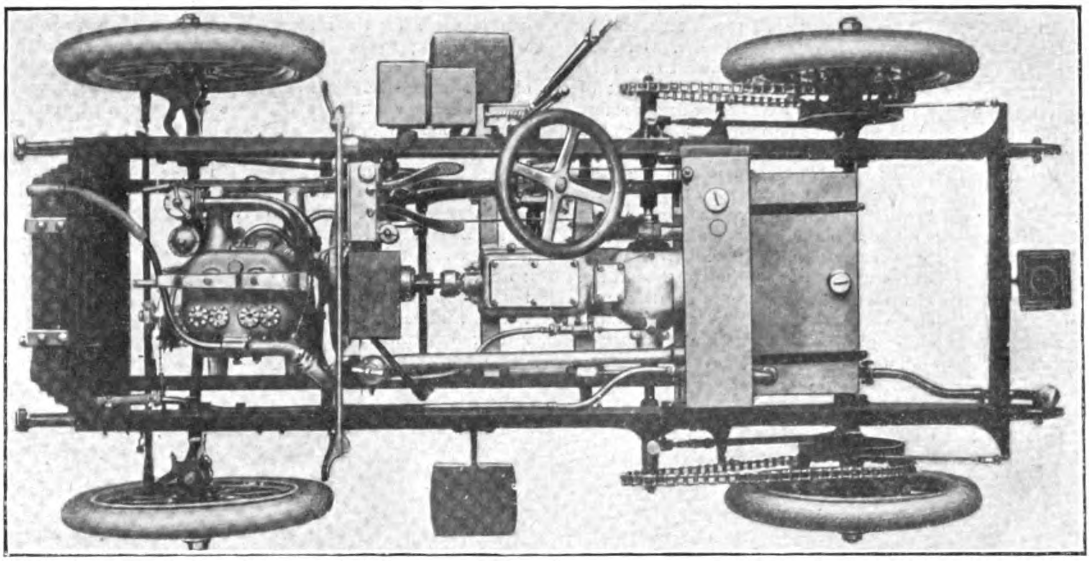
In dealing with both the results of M. Hospitalier and Mr. Hibbert, it must, as we have already pointed out, be borne in mind that the discharges have been invariably taken down to ·75 of a volt. We consider this an impracticable fluctuation from the initial voltage of 1·3. For practical purposes a discharge would have to be stopped at about ·9 of a volt. and in that case the Edison battery would be shorn of at least 10 per cent. of the capacity, on the strength of which the very favourable comparisons between it and lead batteries have, to a great extent, been instituted.



THE EDISON BATTERY.

1.—Complete Cell. 2.—Finished Plate. 3.—Grid. 4.—Pocket ready for insertion. 5.—Cover or Cell.
6.—Cover of Cell with Filling Cap and Gas Valve open.

THE 1903 PARIS SALON.



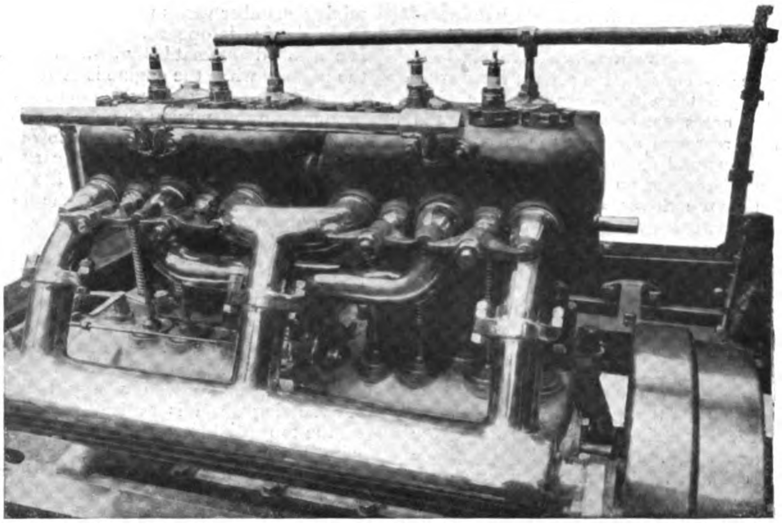
PARIS SALON.—The 1904 Type 9-h.p. Gladiator Chassis, which has a Twin-Cylinder Engine.

THE **De Dion** stall was rendered especially interesting this year to those who are not already familiar with the details of their voiturette and 2-cylinder cars, not only by the chassis shown, but also by sectional models of the engines, and of the Company's special gear-boxes, of which we have given illustrated descriptions recently. The 8-h.p. single-cylinder voiturette, with its 3-speed and reverse-gear, and two twin-cylinder models of 10-h.p. and 12-h.p. respectively, are the standard types of this excellent make of car for next year. The **Decauville** Company have not made any radical alterations in their standard design, which attracted so much attention at the last Salon, although many minor improvements in small details have been introduced. The 4-cylinder chassis shown by them is an excellent example of good workmanship and strong design. It will be remembered that the engine and gear-box are fixed to a metal plate, which forms a dust-proof cover beneath them, and also constitutes a part of the main frame.

The chief feature of the **Gobron-Brillié** stall was the 25-h.p. 4-cylinder chassis, in which a stamped steel frame is substituted for their previous tubular construction; the balanced engine, with its 8 pistons and 4 cylinders, has mechanically-operated inlet-valves arranged on the opposite sides of the cylinders to the exhausts, and in conjunction with them a water-jacketed spray-type carburettor has been adopted in place of the makers' ingenious measuring device. A description of the 20-h.p. Gobron-Brillié car, in which their general system was dealt with and illustrated, appeared in our issues of Sept. 12th, 19th and 26th last, and we need therefore only refer to the new features on the chassis shown. The engine is fixed direct to the main frame, and a high-tension magneto system of ignition is alone used in conjunction with it. The time of ignition is variable, and the speed of the engine is controlled by a governor, which, together with the cam-shafts, and the gear-wheels driving them, is enclosed in the crank-chamber. A gear-driven pump circulates the water through a honeycomb radiator, the fan for which is formed in the flywheel. The carburettor is of a special automatic type, in which the throttle-valve is interconnected with another valve controlling the main air inlet to the carburettor and thus maintains an approximately constant mixture. The clutch is of a peculiar double-cone type, having inner metal-to-metal cone surfaces, and an outer leather-covered cone acting in the usual way. The sliding cone members are so connected together, and to the first-motion-shaft of the gear-box, that the metal-to-metal clutch comes into engagement first, the larger leather-faced cone engaging with the surface formed in the rim of the flywheel subsequently; it is said that a very satisfactory and soft action is obtained in this way. The gear-box, which provides four speeds and a reverse, is fixed rigidly to the main frame, flexible couplings are introduced between it and the clutch, and jaw clutches are fitted into the differential countershaft. A direct-through-drive to the differential is obtained on the top speed, and ball-bearings are employed throughout the gear-box. Internal expanding brakes are employed throughout. The rear springs are very long, and are mounted outside the main frame, and self-aligning bearings are fitted on the countershaft. One large exhaust pipe leads from all four cylinders. The makers also showed their famous 100-h.p. racing car, together with a touring vehicle of the tubular-frame type, which we illustrated on page 1340 (December 12th).

An interesting exhibit was the **20-h.p. L'Automotrice** chassis, which has a 4-cylinder engine, a special pressed-steel frame, two compensated brakes on the countershaft, and an interesting form of main clutch. The engine has its cylinders cast in pairs, with the mechanical inlet-valves arranged on the opposite sides to the exhausts. A low-tension magneto system of ignition is used and is fitted in such a way that it can be timed; no automatic governor is fitted, the throttle valve being controlled by hand, and also connected with the clutch-pedal. The carburettor is of the maker's own special type, and we understand that it will be rendered automatic in future cars. The pressed steel frame is ingeniously constructed in one piece, and has two cross-members for supporting the gear-box, in addition to the transverse members at each end. It receives the engine in front, the front springs are beneath its side members, and the rear springs are arranged outside them. The change-speed-gear gives four speeds and a reverse, with a direct drive to the differential on the top speed; flexible couplings are fitted between it and the clutch, and also in each half of the countershaft. Metal-to metal brakes are fitted on each half of the countershaft, and are connected with a foot-pedal through a compensating device so that they are applied equally and simultaneously. The main clutch is of sufficiently small diameter to allow the flywheel to form a fan between it and the rim. It is of a special scroll type which is brought into operation by a small cone clutch, operated in the usual way by a foot-pedal. When the cone-clutch is brought into engagement it causes the engine to tighten the scroll about its drum, but when the cone is withdrawn the scroll clutch is able to release itself, the cone clutch thus having a kind of "relay" action. The rear brakes, which are compensated by a steel cable, are of the internal type, and are operated by hand lever. The vehicle appears to be very strongly constructed and well-made throughout; the engine and the gear are entirely enclosed on the underside. A complete car, with seating accommodation for seven passengers, was another attraction on the company's stall.

Messrs. **Chenard and Walcker** whose new models consist of an 18-h.p. 4-cylinder vehicle and a 12-h.p. chain-driven twin-cylinder car, showed a chassis of the larger model, as also two complete touring vehicles fitted with Kellner bodies. Both cars had side entrances to the tonneau, and one was fitted with a large hood over the back seat, and with large travelling cases of special construction



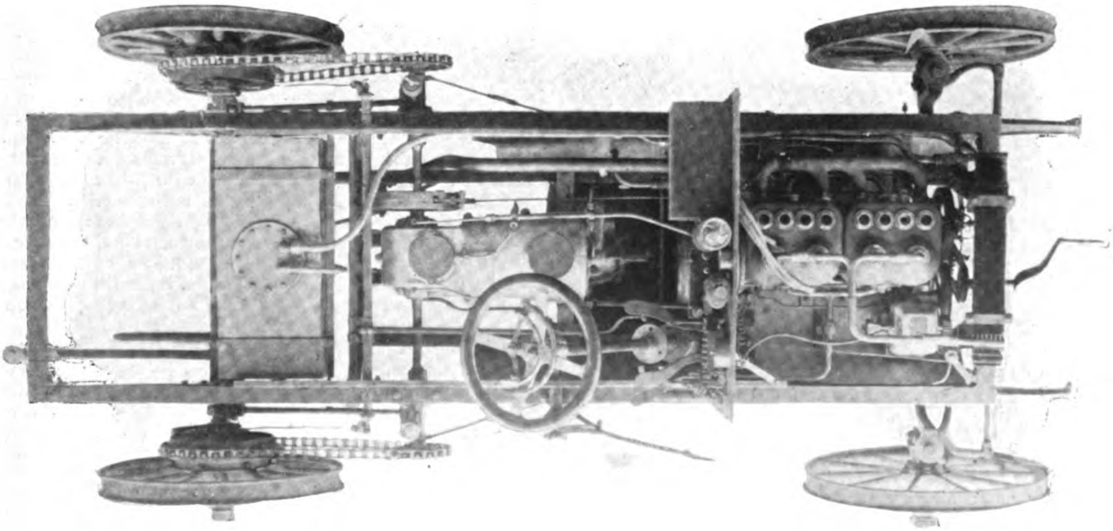
PARIS SALON.—View of the 4-cylinder engine on the Gladiator Car, in which the mechanical inlet-valves are arranged alongside the exhaust-valves on the left with the high-tension igniters above them.

behind, for luggage. This firm still retain their special method of driving the rear wheels from a differential countershaft attached to the back axle, on the 4-cylinder model, but in addition to employing a more powerful engine have introduced several important improvements — notably in the carburettor—of which we shall have more to say before long.

The **Gladiator** exhibit consisted of a 12-h.p chassis, a Limousine car of the same type, and a 9-h.p. tonneau of their twin-cylinder pattern. These vehicles have armoured wood main frames, and an underframe supporting the engine and gear-box. They do not differ materially from last year's models, although several minor improvements have been introduced. A direct-through-drive is obtained on the top speed, from the internal cone-clutch to the differential countershaft, the lay shaft being arranged beneath the direct shaft. The 4-cylinder engine is shown in place from the left side in one of our illustrations, where it will be noticed that the mechanically-operated inlet-valves are arranged on the same side as the exhaust-valves, that the inspection plugs screw into the cylinder-casting, and that the high-tension ignition plugs are fitted immediately above the inlets. The induction and the exhaust pipes are held in place in the cylinder casting by four yokes, and the latter are led to an expansion chamber beside the engine, from which a single pipe passes back to the exhaust box. A view of the twin-cylinder chassis from above is given. It is either fitted with a three-speed and reverse gear, having a direct-through-drive, or with a Napier type gear with an additional forward speed. The price of this 2-cylinder model is reduced. The new vehicles have automatic carburettors, brakes of a new pattern, and a different radiator.

A **20-h.p. Pipe** chassis, in which the Jenatzy magnetic clutch, described by us on July 4th last in connection with our description of the Jenatzy-Martini petrol cars, is employed, was the chief attraction shown by the Compagnie Belge de Construction d'Automobiles, who also exhibited a 12-h.p. car of similar general construction, fitted with an ordinary cone-clutch. The chassis is of the same general design as before (AUTOMOTOR JOURNAL, Vol. VII., p. 864), the frame being built of armoured wood, the engine and the gear-box being carried on an underframe, and side chains being employed for driving the rear wheels. The engine has its cylinders cast in pairs, with mechanical inlet-valves arranged on the same side as the exhausts, a high tension system of ignition is employed, and a gear-driven dynamo is fitted for re-charging the accumulators; the dynamo has an automatic switch mounted upon it, the switch being controlled by a centrifugal governor on its shaft. The engine runs at a normal speed of 1,100 revs. per min., and the carburettor is constructed so that a constant richness of mixture is maintained. Flexible couplings are introduced in the countershaft; the rear brakes, which are compensated, are of the internal type. The regulating levers, which act upon a governed throttle-valve and control the timing, are mounted above the steering wheel. Illustrations of the chassis and of the engine have already appeared, and we now give a view of the former from above.

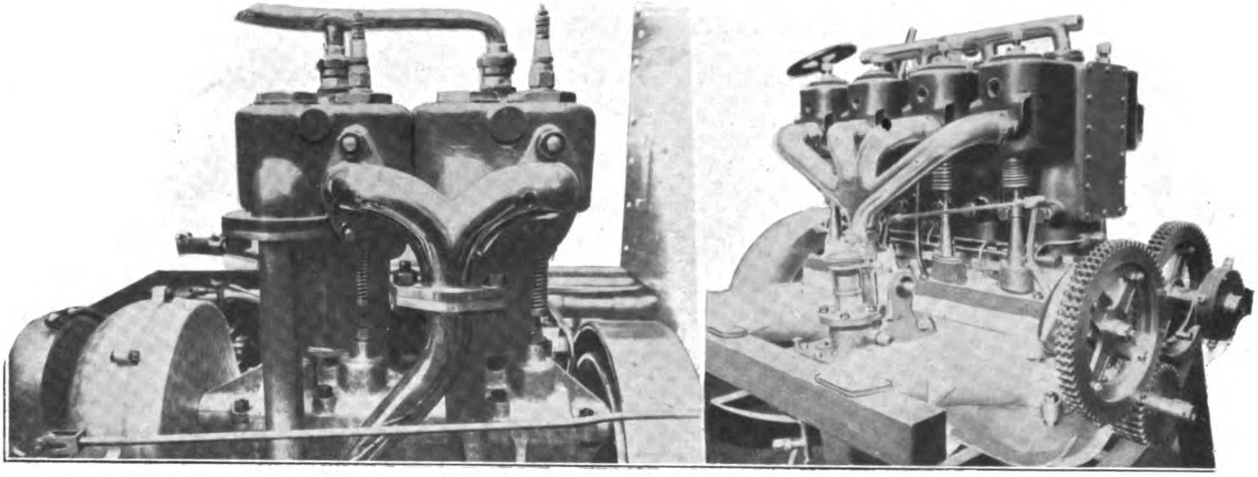
Considerable attention was drawn to the **Martini** stall, owing to the presence of the actual mountain climbing car with which Captain Deasy ascended the Rochers de Naye. It was shown standing on a short length of track similar to that of the railway running up the mountain. It is interesting to note that the sprockets on this car have only two less teeth—nine, instead of eleven—than the vehicle which gained a gold medal in the recent Reliability Trials. A new 16 to 20-h p. chassis was also on view, the 4 cylinder engine of which develops the higher power at 1,000 revs. per min. The mechanical inlet-valves lie on the opposite sides of the cylinders to the exhausts, and the low tension igniters form the inspection plugs above them, each pair being held down by a single



PARIS SALON.—View of the Pipe Chassis from above.

yoke and nut. The chassis, which differs but little from the Rochet-Schneider model shown on that Company's stall, has a pressed steel frame and an unusual shaped underframe, which passes along beneath the engine, and, bending down to a lower level, lies beneath the gear-box to support it. The gear box is thus rendered thoroughly rigid with the frame. The rear springs lie outside the frame, the level of which above the ground is thus reduced. Quite a long shaft, fitted with universal joints, connects the cone-clutch with the change-speed-gear, and the spring which normally holds the clutch in engagement is placed above this shaft with its rear end attached to the gear-box. Ball-bearings are used throughout and extremely powerful brakes are fitted. The foot-pedals are arranged so that they are pressed forward instead of downward by the driver, and they are so constructed that they can be adjusted as to length to suit his convenience. The accelerator-lever is fitted above the steering-wheel, and the timing-lever on the dash. An automatic type of carburettor is used, the control of which is connected with the clutch ; it is exhaust jacketed.

The 20-24-h.p. chassis shown by the **Prunel Company** has an armoured wood frame to which the engine and the gear-box are directly attached. It is of the chain-driven type, and the counter-shaft is fitted with jaw couplings. The cone-clutch is of large size, as also is the gear-box, which provides four speeds and a reverse, with direct drive to the countershaft on the top gear. The engine has its cylinders cast in pairs, the mechanical inlet-valves are on the opposite side to the exhausts, and high-tension ignition plugs are fitted into the heads of the cylinders. The circulating pump is driven by friction off the flywheel, and a fan-cooled honeycomb radiator forms the front of the bonnet. These makers also showed a 4-cylinder engine in which a separate casting is used for each cylinder, and, in addition to this, they had on their stall a complete car of their twin-cylinder type.

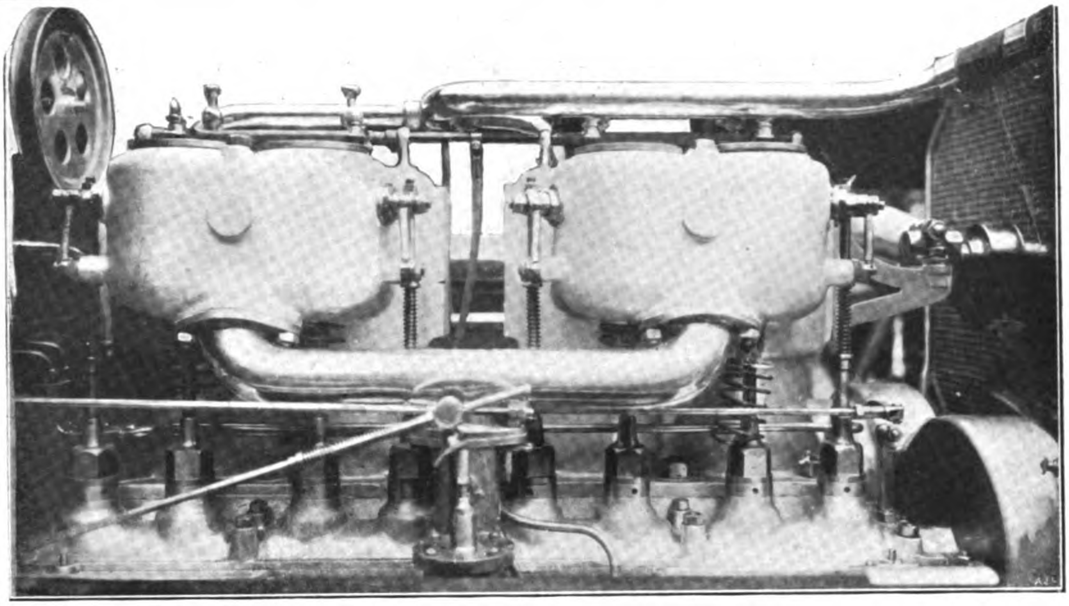

A twin-cylinder C.G.V. Engine. A 4-cylinder C.G.V. Engine.

PARIS SALON.

The **C.G.V. Exhibit** included samples of their latest chassis, and several finished cars. Among the interesting samples of the Company's work, the application of ball bearings to the crank-shafts of petrol engines was noticeable, extremely large balls being used for this work. Three chassis of 15, 25, and 40-h.p. respectively were shown, the smallest having an engine fitted with atmospheric inlet-valves, and a hinged induction pipe arranged as last year, but the larger models have mechanically-operated valves instead.

Two well-finished chassis exhibited by the **Peugeot Company** attracted a good deal of attention, the one having a 4-cylinder engine and a pressed steel main frame, the other a twin-cylinder engine, an armoured wood frame, and an underframe for the engine and gear-box. The larger car was of the chain-driven type, and the smaller had a live-rear-axle driven by a universally-jointed propeller-shaft. In both engines the cylinders are cast in pairs, and the mechanically operated inlet-valves are arranged on the opposite sides to the exhaust-valves. A special form of automatic carburettor is employed in which the spray jet has eight small holes arranged in two opposite vertical rows passing out sideways instead of the usual single central hole in its top. A small plunger fits down into the jet, covering or uncovering a greater or less number of holes, two by two, as it is moved up and down. The plunger is connected with the throttle-valve, so that it moves in unison with it, and thus the quantity of petrol passing into the mixing chamber varies proportionately with the extent to which the throttle-valve is opened. The air supply to the mixing chamber is controlled automatically by a sliding sleeve which normally closes the passage when the engine is at rest, but opens when the engine is running, to an extent which depends upon the degree of suction produced in the mixing chamber ; this automatic device practically maintains a constant pressure (below that of the atmosphere) in the mixing chamber. On the larger car the gear-box is connected with the main clutch, through a long flexibly-jointed shaft, and is fixed rigidly to two cross-members of the frame. The engine, which has high-tension and magneto-ignition systems—both capable of being timed—is enclosed on the underside by a casing which passes back right up to the front end of the gear-box. On the chassis shown two foot-brakes were fitted on the countershaft, the one inter-connected with the clutch, the other quite independent. The side-brakes are of the expanding type compensated by a pivoted beam lying across the frame. The small levers which regulate the time of ignition and act as an accelerator, respectively, are fitted above the steering wheel in such a way that they are not moved when the steering wheel is turned. A direct-through drive is obtained on the top speed to the differential, and the countershaft is fitted with jaw couplings. An adjustment is provided at the bottom of the steering-pillar so that all backlash can be taken up as soon as it appears. The engine on the smaller car is a 7-h.p, and is in general respects similar to the 15-h.p. model just described. The change-speed-gear on this vehicle gives three forward speeds and a reverse, with the usual direct drive on top speed. The foot-brake is mounted on the longitudinal shaft close up to the back axle, and is applied by a right and left-handed screw action, which renders it absolutely double acting ; it has metal friction surfaces, and is very powerful. The live-axle is mounted in ball bearings, and the side-brakes are similar to those on the larger model. In both types plain bearings are used in the gear-box, and these are automatically lubricated by small chains, which run round in little oil baths formed beneath the bearing. Both chassis, too, had anti-vibration devices fitted between the axles and the frame, these acting against the side springs in such a way as to prevent any swinging motion being set up when travelling over very rough roads.

The **Delahaye Company** showed two 4-cylinder chassis of different design, both chain-driven, and constructed with pressed steel frames. In one of these the differential on the counter-shaft, together with the bevel wheels driving it, are enclosed in a separate casing from the gear-box proper, and the foot-operated brake is mounted between the two casings. In both machines the transmission-gear between the cone-clutch—which has an easily-removable leather face—and the side chains, is supported at three points only, being carried by the tube enclosing the countershaft, and at a single point in front. The engines are fixed direct to the main-frames, and have their cylinders cast in



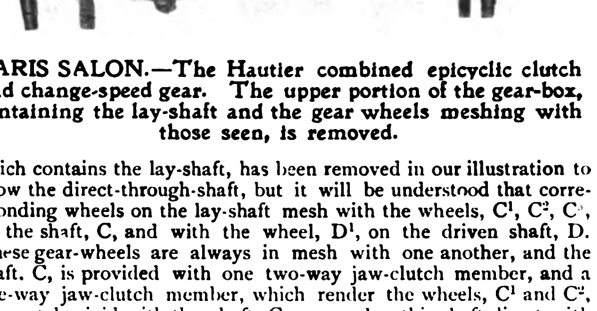
PARIS SALON.—The new 15-h.p. Peugeot 4-cylinder Engine, from the right, showing automatic Carburettor with induction-pipe, and the low-tension Igniters, which are operated by the same Camshaft as the Inlet-valves.

pairs, atmospheric inlet-valves are used. Another interesting exhibit on the stall was a special petrol motor designed for launch work, the peculiarity of which is that the two halves of the crank-chamber are hinged together, and the bearings for the crank-shaft are formed in the lower part only; the moving parts in the crank-chamber can, therefore, be got at by swinging the cylinders, and the upper portion of the crank-chamber to which they are fixed, back about the hinge. A large *char-a-banc*, a *camion*, delivery vans, and two beautifully-finished touring cars were also on view on another stall, side chains being used for driving the rear wheels in all cases.

A large **F.I.A.T.** 150-h.p. engine attracted a good deal of attention on the stall of this Italian Company. It has four cylinders, and on a huge scale follows the general lines of construction adopted by the makers on their touring vehicles, of which samples were shown, practically identical with the car described by us recently (Automotor Journal, Vol. VIII., page 1299). The large engine is intended to run at a normal speed of 600 revs. per min., and has been built to the order of the Italian Navy. Their 1904 cars have pressed steel frames, and a special form of metal-to-metal main clutch, which runs in oil; a honeycomb radiator is also fitted to them.

In the new **Gillet-Forest** chassis. the manufacturers have adhered to their original system (Automotor Journal, Vol. VII, page 92), in which it will be remembered that a single-cylinder engine, placed horizontally in front, is employed, and that the power is transmitted from it to the main-clutch through a bevel-driven half-speed shaft, the forward end of which constitutes the cam-shaft and receives the starting handle. A tubular main frame, stiffened by side plates, is employed on the 12-h.p. model, the change-speed-gear is of the sliding spur-wheel type, in which the second-motion shaft is arranged centrally with the first-motion shaft to the left of it, and the power is transmitted from the gear-box to the live-rear-axle by a universally jointed propeller-shaft. The stationary casing containing the live axle is tied to a cross member of the main frame by a tubular casing, through which the propeller-shaft passes; this casing is connected with the frame by a ball and socket joint. Two brake drums are fixed to the hubs of each of the rear wheels, the one pair being acted upon by a hand lever, and the other by the foot-pedal; both the brake pedal and the clutch pedal are of unusual shape, being formed with a sort of toe clip in front.

The two **Hautier** twin-cylinder chassis, which were on view, differed somewhat from one another in details, and are of somewhat unusual and ingenious design. The main-frame is constructed with channel members and tubular cross members, the engine is fixed some way back from the front of the frame, and the crank-chamber is bolted direct to the gear-box. The crank-shaft projects forward, carrying the flywheel in front of the engine, and driving the circulating pump at its extreme end. The flywheel is of peculiar shape, and forms a fan, which forces the air through a spiral radiator placed in front of it. The engine has mechanically-operated inlet-valves on the opposite side to the exhaust-valves, and one of them had the inlet-valves so arranged that the time at which they opened and closed was variable. The main-clutch, A, which is shown together with a portion of the change-speed-gear in our illustration, is, in reality, an epicyclic train of the well-known sun-and-planet type. The crank-shaft is fitted with a spur-wheel, which meshes with planet wheels carried on a spider attached to the gear-shaft, C, and these planet wheels mesh with an internal gear-ring, which is normally free to revolve, but can be gradually brought to rest when the brake, B, is tightened up to hold it; the two portions of the brake, B, receive a shaft having a left and right-hand thread, which, when turned in the one direction tightens them about the drum, and in the other direction frees them. This form of clutch gives a progressive action, enabling the vehicle to be started gradually, and it also reduces the speed of the shaft, C, relatively to the crank-shaft in the ratio of 1 to 3. The upper portion of the change-speed-gear, which contains the lay-shaft, has been removed in our illustration to show the direct-through-shaft, but it will be understood that corresponding wheels on the lay-shaft mesh with the wheels, C^1, C^2, C^3, on the shaft, C, and with the wheel, D^1, on the driven shaft, D. These gear-wheels are always in mesh with one another, and the shaft. C, is provided with one two-way jaw-clutch member, and a one-way jaw-clutch member, which render the wheels, C^1 and C^2, alternately rigid with the shaft, C, or couples this shaft direct with the shaft, D. The necessary movements of the jaw-clutches are controlled by a cam-plate, E, which is given a rotary motion by the change-speed-lever. The power is transmitted from the shaft, D, to the live axle by a propeller-shaft, and the axle itself is fitted with other cardan joints, inside the stationary casing containing it, so that the road-wheels can be dished instead of lying parallel with one another as usual. The same type of brake is fitted behind the

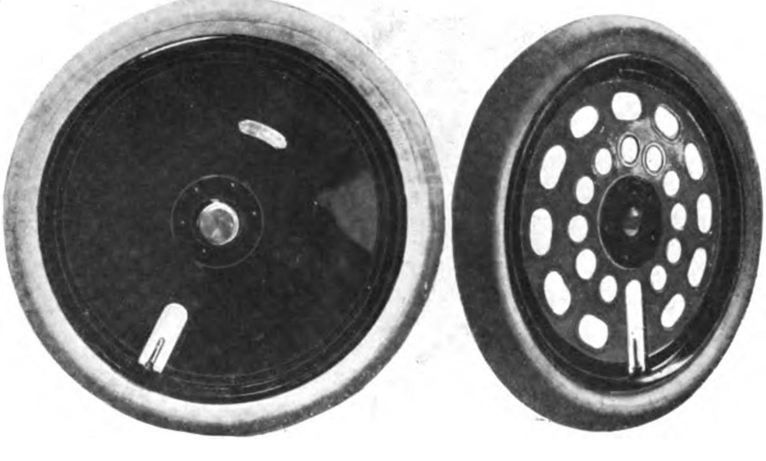


PARIS SALON.—The Hautier combined epicyclic clutch and change-speed gear. The upper portion of the gear-box, containing the lay-shaft and the gear wheels meshing with those seen, is removed.

gear-box as that which operates the main-clutch, and this brake is applied by a hand-lever at the side of the driver, the hub-brakes being connected with the brake-pedal. We understand that the company are also making 4-cylinder cars on a similar principle.

A 30-h.p. Ville Car was shown by the Société d'Industrie Mecanique, the special feature of which is that only two forward speeds and a "reverse" are provided, of which the top speed—alone intended for use under ordinary conditions—is a direct-through drive to a propeller-shaft and the live axle. No side levers are provided; one foot pedal acts upon the clutch, and subsequently upon the differential brake. Another pedal operates the compensated side brakes, and a hand lever on the steering pillar introduces the hill-climbing gear or the "reverse." The engine is unusually large for the size of the chassis, and the crank-shaft is placed very low down. In the smaller 2-cylinder, 15 h.p. car, made by the same firm, three forward speeds are provided by the sliding-spur-wheel gear, and a "reverse" gear of the epicyclic type is introduced into the main clutch. The same pedal that disengages the clutch brings the progressive "reverse" into operation, if still further depressed. The engines have mechanical inlet-valves, arranged on the same side as the exhaust-valves, and a constant degree of compression is maintained in the cylinders by the provision of supplementary exhaust ports, which are uncovered by the pistons as they are about to complete their down strokes.

A **24-h.p. "Herald"** chassis was shown by the Société manufacturing these cars, who also make a 10-h.p. of similar design, and had an 18-h.p. chassis of older type with atmospheric inlet-valves on their stall. In the new models, a pressed steel frame is used and the springs are mounted outside it. The 4-cylinder engine has its inlet and exhaust valves arranged on opposite sides, is provided with low-tension Simms-Bosch magneto ignition, and has an automatic carburettor. The water pipes to the jackets both lead in at the top, as in the Bollée, the one passing down through to the bottom of the jacket. The lift of the inlet-valves is variable, and the time of ignition can be adjusted, both these operations being performed from small hand-levers placed above the steering wheel; a third lever alongside them acts as an accelerator. The inlet-valve mechanism is of that type in which horizontal, pivoted levers lie between the cams and the push-rods, and can be moved inwards and outwards between them. A double flexible coupling is introduced between the clutch and the change speed gear, and jaw couplings are introduced into the differential countershaft. The lay-shaft is arranged beneath the direct-through-shaft in the gear-box, the usual brakes are fitted, and those on the hubs on the rear wheels are compensated by a cable.



PARIS SALON.—Two Stier—all metal—wheels, fitted with pneumatic tyres. The two halves of the rim, as also the two portions of the hub, are held together by bolts, which pass through the flat central steel plate.

PARIS SALON.—The Stand of the Collier Tyre Company.

ONE of the most delightful seaside spots on the French coast is Le Touquet, within a short train run of Boulogne. Every consideration for the entertainment of visitors is given by those responsible for the conduct of this charming summer resort, and automobilists may find it a convenient moment next May to form or renew acquaintance with the little town, when it is proposed that one of the automobile runs of the season from Paris is to finish at this spot. Those responsible for looking after the interests of the township are indeed well selected for their office, judging by the delightful literature which they have prepared for the information of intending tourists, pointing out the natural beauties of the spot and its surroundings. Not the least attraction is the existence of excellent golf links, controlled almost entirely by Englishmen, headed by the Duke of Argyll as President. We shall hope to see a strong motoring contingent present during May at the finish of the automobile event, which we understand is to be made an occasion for special fêtes. The journey from London under special arrangements with the railway companies occupies only about five hours.

THE PROGRESSIVE EAST.

THE Straits Settlements are among the smallest of British Colonies. They are also a good deal further east than most; further away, that is, in the particular part of the world that everyone has hitherto regarded as the most rigidly opposed to the introduction of Western improvements—particularly mechanical improvements. None the less the automobile has found its way there, and has not only found its way, but is becoming a feature in the town traffic of Kuala Lumpur, the Federal capital of the Straits Settlements. A Penang journalist recently paid a visit to that capital, and was impressed by the number of automobiles that he found mingling in the streets with the landaus, dogcarts, gharries, and rikshas, which are the characteristic vehicles of most Oriental towns where the British are supreme. The Englishman is certainly progressive in his Colonies. The fact that in a comparatively out-of-the-way British Colony there should be not only automobiles, largely of British manufacture, but that automobilism in the Colony is unhampered by foolish restrictions, particularly by a speed limit, ought to be an object lesson to the world, and particularly to the Mother Country.

For an automobile law has recently come into force in this far Eastern dependency which for a progressive liberality leaves little to be desired, and is in most respects all that an automobile law ought to be. We are indebted for a copy of this enactment to Mr. Zacharias, who was associated with the early development of automobilism in this country, and who is now residing in Malay. It is not altogether unlike Mr. Long's Bill as introduced into the House of Lords, and before the Commons had "dealt" with it. There is no speed limit outside towns, and the clause regulating the rate at which an automobile shall travel declares that "no automobile shall travel at a greater speed than is reasonable or proper, having regard to the other traffic on the thoroughfare, or so as to endanger any of the public or any public or private property." There is nothing in this, it will be seen, about the traffic that might be reasonably expected to be on the highway. In the Straits Settlements they are evidently not so enamoured with the egregious decision in Mayhew *v.* Sutton that they are anxious to introduce a special phrase in order to preserve that decision as a ruling case. In the open country in the happy Straits Settlements, therefore, the automobilist may go at what speed he pleases, provided he exercises due consideration for the other users of the road. In the towns there is a limit of 12 miles an hour, and this surely is reasonable enough. There are other features in the Straits Settlements law which might with advantage have been copied by the Legislature of this country. Novices are allowed to practice driving on unfrequented and out-of-the-way by-roads, with, we presume, the implication that they are to be kept off important thoroughfares, and they are always to have a competent driver in charge of them. It is necessary for anyone to drive a car to have a certificate of competency, and no one suffering from defective sight or hearing is permitted such a certificate. The comprehensive definition, too, of the automobile is of interest. An automobile, according to this enactment, "includes every description of vehicle propelled by mechanism contained within itself, excepting such as are constructed for use on specially prepared ways, such as railways or tramways."

Of scarcely less interest than the terms of the enactment itself is the spirit in which the Straits Settlement Press comments on it. A speed limit it looks upon as an unenforcible restriction which does not really guarantee the safety of the public, and is in practice unenforcible, mainly owing to the difficulty of establishing an infraction except in very glaring instances. Evidently in the Straits Settlements they have none of our constabulary "stop-watches," and have not introduced the methods and "evidence" of our Surrey police. There, at any rate, it is evidently presumed an infraction of the speed limit would have to be *fairly* proved. The view on the whole question of the *Malay Mail* is noteworthy. Our contemporary declares that "in our go-ahead States we should not be behindhand in adopting the form of traction which we venture to predict will soon be universal." Behindhand indeed! We should think not! Why, instead of being behindhand they are leading the world.

A similar progressive and liberal spirit is displayed in the draft rules published in the *Calcutta Gazette* last month, which it is proposed to make under the Bengal Motor Car and Cycle Act of 1903, though there are one or two provisions which would be unlikely to commend themselves to automobilists in the old country. One of these is that a car can only be left standing in the street in the custody of a driver certified to be competent to drive. This is clearly ridiculous, and must be an oversight on the part of the framers of the measure. Even in Europe it would cripple the industry if such a proposal were enforced, and in India, where drivers are vastly fewer, the effect of attempting to enforce it would be absurd. A proposal is put forward that an effective speed indicator must be carried on every car. Evidently the Indian authorities are determined not to rely solely on police evidence. Where a driver is accused of exceeding the 12-mile limit in towns, he will have his speed indicator to back him up if innocent. It must be remembered that evidence is more unblushingly unreliable in India than even in Surrey. Were there not in the last Indian census a number of persons who quite seriously described themselves as "professional bearers of false witness"?

In far Japan, too, the automobile is gradually feeling its way. Messrs. Abenheim Brothers, of New York and London, have established an agency in Yokohama for the import of motor vehicles, and have already sold Oldsmobile, Duryea, Waltham, Thomas, De Dion-Bouton, and Clement cars. Altogether, they tell us, there are some twenty automobiles in the land of the chrysanthemum, the first machine having been imported by a member of their firm in 1900. Unfortunately the roads hitherto are anything but good, but in spite of this a 7-h.p. Clement which they supplied to the Mitsui Gofukoten, a large business in Tokio, has been working in a most satisfactory manner, and has run upwards of 5,000 miles since its delivery. The heavy duty of 25 per cent. on all motor vehicles has acted hitherto as a bar to their introduction, and in this respect it is interesting to observe at any rate one instance in which a protective tariff has so far operated to prevent the development of an industry by stopping the demand which in the first instance would probably have been created by free importation. However, the demand is evidently coming, and there is an opportunity of doing good business, as the duty on parts, and even finished chassis without bodies, is so very much less than that on the completed car that manufacturers arranging to assemble parts in the country would be likely to obtain excellent returns for their outlay in the very near future. Japan is so progressive that doubtless at an early date an adequate scheme of road improvement will be forthcoming, and those manufacturers who are sufficiently far-sighted to arrange in time for supplying the Japanese demand should reap a valuable reward for their foresight and enterprise. The American Consul in Formosa is getting out a report on the whole question of automobilism in Japan. American Consuls do these sort of things. Some day perhaps British Consuls will generally follow their example. Messrs. Abenheim Brothers have with characteristic enterprise printed an illustrated catalogue in English and Japanese, which looks very quaint.

REVIEWS OF BOOKS.

"Travellers' Colloquial French." A Handbook for English-speaking Travellers and Students. By Howard Swan. London: David Nutt. Cloth, 1*s*. 6*d*.

A PHILOLOGIST once observed that French had really become an agglutinative language, though it was written like a grammatical one, and when we see attempts of the kind made by Mr. Swan to spell French phonetically the truth of this observation becomes very apparent. Thus, for instance:—"*Aiss Vairr-sigh?*" "*Aiss eecee?*" Mr. Swan's way of facilitating the pronunciation by English people of "*est-ce Versailles*" and "*est-ce ici?*" Perhaps this method may facilitate the picking up of colloquial French, and may consequently be useful to the large and growing number of Englishmen whom the automobile movement takes to France, but we certainly doubt whether anyone who learns French in this way will ever be able satisfactorily to read or write it, and we are not quite sure that it isn't better to take the bull by the horns in the first instance, and learn straight away how combinations of letters are pronounced by French people. Mr. Swan's book, however, is a most painstaking and thorough effort to carry out his scheme of instruction, and his book also contains a great deal of information generally useful to the traveller in France.

"Der Automobil-Sport." By Max R. Zechlin. Leipzig: Grethlein and Co.

THIS is a handy little book for German automobilists, and covers pretty well most of the familiar ground, and gives a general exposition of the leading features of modern petrol motor cars, a great many hints and suggestions of their management and driving, and a short and somewhat fragmentary history of the automobile movement. The description of the automobile might not be incorrectly characterised as an account of a petrol motor vehicle in general, and suffers in consequence from generality, the details of any particular system being naturally somewhat different from the representative mechanism which the author describes. This, however, is a small objection, as the selection of parts illustrated is extremely good. The same objection to some extent applies to the instructions and hints for the management and driving of cars, as some of the particular things that we are told to do only apply in the case of particular makes of vehicle, and are inapplicable to other forms of car. The work is commenced by a historical chapter illustrating and describing some of the old steam vehicles, amongst which, by the way, we do not find some of the most important and characteristic ones. We have often attempted to scotch the old fallacy that it was the red flag Act which destroyed the early steam road car industry, and here we have the same old fallacy coming up smiling again. The steam road car industry was dead and buried in 1840, and the man with the red flag was not made a statutory personage till 1865.

"The White Bulletin." Cleveland, Ohio.

THIS is a little publication which is to be issued periodically by the White Sewing Machine Company, of Cleveland. The first number gives a very graphic idea of the activity that prevails in the White steam car in the United States. It is exceedingly well illustrated and shows us the now standard type of White car both as arranged for touring, actually engaged in long-distance tours, and breaking records on the track. Particularly attractive is the illustrated description of the employment of a White steam car to pace the celebrated trotter, Cresceus, when he covered the mile in 2 mins. 0$\frac{8}{10}$ secs. Other portions are taken up with testimonials and statements regarding the capabilities and general excellence of these now well-known machines, which to our readers are probably superfluous, as the reputation of the White car is already adequately established in this country. The second number, also to hand, gives an interesting and well-illustrated account of the adventures of the White cars on the terrible New York-Pittsburg Endurance Tests. One of the illustrations shows the White car going through a slough of despond, which in America is dignified with the name of a road. As under the weather conditions then prevailing the mud on this track reached very nearly to the front axles, how thoroughly the run was an "endurance test" can be faintly imagined.

"The Little Guides." (London: Methuen and Co. 3*s*.)

MESSRS. METHUEN AND CO. are always enterprising, and the present series of little handy guide-books, designed to appeal to the more thoughtful and possibly more artistic members of the community, will certainly command a ready sale. As they are provided with very good maps and excellent roadside descriptive matter they ought to appeal to automobilists rather more than other people, as car owners traverse a much greater amount of country. It would be well perhaps, too, if this series of publications were to be successful in stimulating interest in the natural features of their country, and interest in its history and traditions, amongst car owners. Certainly the sale of these publications and the excellent way in which they are illustrated should have this effect. Amongst those which have appeared are: "Oxford and its Colleges," "Cambridge and its Colleges," "Shakespeare's Country," "Sussex," "Malvern County," "Norfolk," "Cornwall," "Brittany." The authors include the Rev. S. Baring Gould, and the illustrators Mr. E. H. New, Mr. B. C. Bolter, Miss Wylie, and Miss Alcock.

"Secondary Batteries." A Practical Handbook for Owners and Attendants. By an Engineer. (London: Alabaster, Gatehouse and Co.)

WHEN Mr. Wade's book on accumulators appeared we made the remark that we were often in difficulty through correspondents asking us to recommend a good work on accumulators, and that Mr. Wade's book put us out of that difficulty as it was all that a work on such a subject ought to be. We may now add to this statement that we have equal pleasure in recommending to our readers the above work. It is not as elaborate as Mr. Wade's, and does not go to anything like the same extent into the various interesting theoretical considerations of the subject, and, therefore, for anyone who desires to make an exhaustive study of the accumulator question it can in no sense replace that book. But it has, on the other hand, the distinct advantage of giving practically all that either the amateur or the ordinary skilled workman who is likely to come into contact with accumulators will ordinarily require to know, in very much shorter space than does Mr. Wade's book, and it puts out the information it supplies with considerable lucidity. Anyone reading this book carefully through will have a very good working knowledge of ordinary accumulators and the principles involved in their manufacture and management. No particular makes of cell are recommended, but this, as the writer explains in his preface, is done purposely, and it is perhaps as well that it should be so.

"The Electrical Times Directory of Charging Stations." (*The Electrical Times*, 8, Bream's Buildings, Chancery Lane, E.C.)

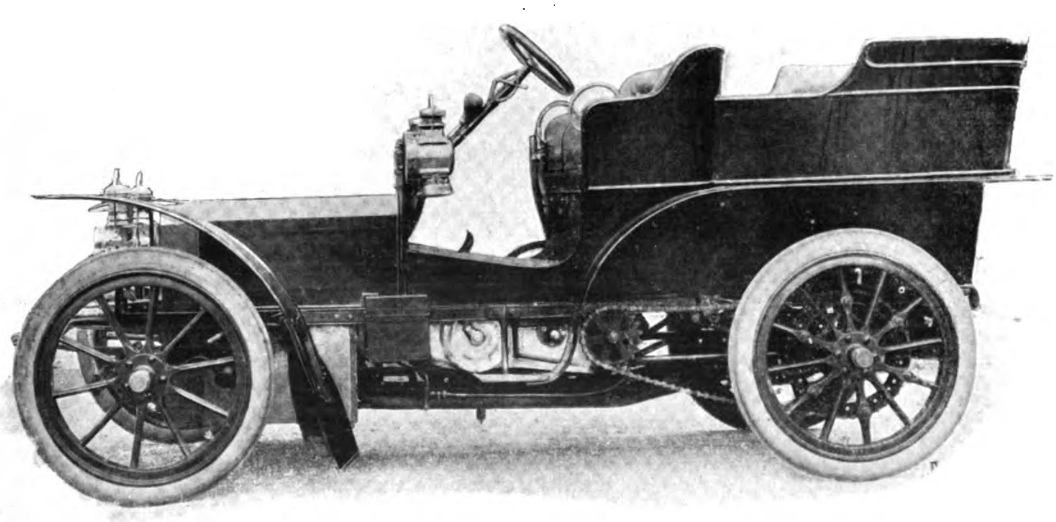
THIS is a most useful little pocket work of reference for all automobilists, and particularly electromobilists, as it contains a complete and exhaustive list of all the towns in England where car batteries or ignition cells can be charged, or where car repairs can be executed. It is accompanied by an excellent map, in which every town where ignition cells can be charged is shown underlined, while charging stations, at which current can be obtained for car batteries, are indicated by a circle or a cross according as the source of current is a public or private installation. Repairing facilities are indicated by a triangle, and garage accommodation by a dot. The Directory portion consists of three columns, with the towns in the left hand, the names and addresses of the electrical undertakings in the middle column, and their capabilities for charging in the right hand column. For anyone desirous of undertaking a tour with an electric vehicle this little work would be almost indispensable, and it will be found very useful by all automobilists who obtain their ignition current from cells. It is a pity, therefore, that its handiness is impaired and facility of reference to its contents greatly impeded by the wholesale interleaving of trade advertisements which disfigures it. The only portion of the work free from these is that in which they are replaced by a reprint of the Motor Cars Act of 1903.

1,000 MILES RELIABILITY TRIAL.

Technical and Descriptive Data Concerning the Competing Cars in order of Official Numbers (*Continued*).

Class E (*Continued*).—Cars more than £550 and not more than £700.

18-h.p. Star (No. 99).—During the first day, a few marks were lost on the road, and one at Maidstone for replenishing, and on the following day the chain wheel broke away from the driving wheel at Uckfield, necessitating withdrawal from the trials. The usual arrangement of parts adopted in these makers' chain-driven cars is employed, and the driving mechanism is mounted upon an armoured-wood frame and an under-frame. The 4-cylinder engine has mechanical inlet-valves arranged opposite to the exhaust-valves. It is automatically governed on the throttle, has a high tension ignition system, a float-feed carburettor, and runs at a normal speed of 900 revs. per min.; the b.h.p. at 1,200 r.p.m. is about 21·5. The wheel base is 7 ft. 3 in., the track, 4 ft. 4½ in., and the wheels are shod with Dunlop tyres 870 by 90 mm.



1,000 MILES RELIABILITY TRIAL.—The 18-h.p. James and Browne Petrol Car (No. 100).

18-h.p. James and Browne (No. 100).—The troubles experienced on the road, which prevented more than four non-stop runs being recorded, were only responsible for a loss of 6 marks, and, apart from replenishing and lubricating, 1 mark—delay in starting—was alone lost. The vehicle is in general respects similar to the smaller car run by these makers (No. 47), but the engine has four horizontal cylinders instead of two. The frame is built of channel steel with tubular stays, the engine runs at a normal speed of 700 revs. per min., and the compression is about 80 lbs. per sq. in. High tension ignition is employed, and the carburettor is of the float-feed type. An internal cone-clutch, with metal-to-metal friction surfaces, is used, and it has four springs for holding it in engagement. The cooling water is circulated, by a chain-driven centrifugal pump, through the jackets and through a finned-tube fan-cooled radiator in front. The brakes are of the metal-to-metal type, and those acting inside the chain rings on the rear wheels are compensated. The wheel base is 8 ft., the track 4 ft. 2 ins., and the artillery wheels are shod with Michelin tyres.

24-h.p. Wolseley (No. 102).—But for trouble with the clutch, causing a loss of 1 mark, and for a hot bearing on another day, costing 2 marks, non-stop runs would have been made throughout the trials. In garage 1 mark went for replacing an axle-cap, but otherwise replenishing and lubricating were the only causes of loss. This vehicle has a pressed-steel frame of tapering cross-section, and follows the well-known Wolseley lines throughout. The engine runs at a normal speed of 800 revs. per min., and can develop about 28 b.h.p. at 1,100 r.p.m. The compression is about 75 lbs. per square inch, and the engine is fitted with the Company's special exhaust-valve springs. The brake pedal is coupled to the throttle valve, and both the hand and foot brakes act direct upon the hubs of the rear wheels. The wheel base is 7 ft. 6 in. and the track 4 ft. 4 in. Ball bearings are fitted to the gear-box and to the road wheels, which are shod with Dunlop tyres.

20-h.p. Winton (No. 104).—A good deal of trouble was experienced on the second day; 119 marks were lost in attending to the ignition apparatus and the carburettor, a further 5 for attending to the clutch, and 35 for clearing a pipe. On another day 6 marks went in attending to the clutch, and otherwise two tyre troubles lost 10 marks. On the fifth day the crank-shaft broke at Carshalton, as already reported. In garage 8 marks in all were lost in tightening the clutch, 7 adjusting the carburettor, and 8 replacing an accumulator. The car has a special steel frame to which the 2-cylinder horizontal engine and the change-speed-gear are attached direct; the inlet-valves are atmospheric, and the cylinders lie opposite one another with the crank-chamber between them. The speed of the engine is controlled by a special governor operated by air pressure, acting upon the spindle of the inlet-valves. The normal engine-speed is 800 revolutions per minute, the compression 65 lbs. per square inch, and the b.h.p. about 22. A high-tension system of ignition is used, and the carburettor is of the float-feed-spray type. Oil is fed to the engine from a special lubricator, in which a constant level is maintained by a float. The clutch has flat, metal-to-metal surfaces, and is operated by a hand-lever. The change-speed-gear is of the spur-wheel type, in which the wheels are at all times in mesh with one another. Two speeds and a reverse are available, and the wheels run in an oil bath. The rear-axle is of the live type with roller bearings, and is driven by a central chain. The wheel base is 6 ft. 6 ins., the track 4 ft. 8 ins., and the tyres are 810 by 100 mm.

10-h.p. Gardner Serpollet (No. 105).—Only one reliability mark was lost, and that for stopping on a hill the first day; otherwise non-stop runs were made throughout. In garage two or three marks each day went for starting, over and above replenishing and lubricating, but except for these, and for two marks caused by tyre trouble, only one mark went for attending to the mechanism—cleaning the burner. This vehicle, which won the gold medal in its class, is constructed on the well-known lines fully described by us in our issues of June 28th to July, 19th, 1902. The generator has twelve coils, each of which is constructed of about 18 ft. of tube. The power is transmitted from an 8-tooth sprocket on the engine to a 25-tooth chain wheel on the back axle. The wheels are shod with 810 by 90 mm. tyres, the wheel base is 7 ft. 3 in., and the track 4 ft. The fuel tank holds 20 gals. of ordinary paraffin, and the water capacity is also 20 gals.

24-h.p. Georges-Richard (No. 106).—Non-stop runs were made on each of the five last days, and were only spoilt on the first and third day by tyre troubles, costing 5 marks on each occasion. On the second day 6 marks were lost for replenishing on the road, and 1 for trouble with the clutch. The tyres too were responsible for the loss of a few garage marks (11) and a few minor adjustments and repairs were also made. The car is of the live-axle type and has ring-lubricated bearings on the back axle, in addition to ball-thrust bearings. The main frame and under frame are tubular, a flexible coupling is fitted between the clutch and the gear box, the foot-brake behind the gear box has cast-iron shoes on a malleable drum, and the usual hub brakes are fitted. The engine has atmospheric valves and is governed on the throttle valve, subject to an accelerator. It runs at a normal speed of 1,000 revolutions per minute, and at 1,300 revolutions per minute it develops about 26-b.h.p.; a low tension magneto system is employed, and the carburettor is of the float-feed type. Four speeds and a "reverse" are available, the wheel base is 7 ft. 5 in., the track 4 ft. 3 in., and the wheels, which run on plain bearings, have 870 by 90 mm. Clincher Michelin tyres.

16-h.p. Dennis (No. 108).—This vehicle failed to make non-stop runs on four out of the eight days, owing chiefly to trouble with the accumulators and in having to replenish the tanks on two occasions on the road. From these causes it lost nine marks. The accumulators, too, were responsible for the loss of a few marks in garage, which together with sundry minor adjustments of the brakes resulted in a loss of 14 marks, apart from replenishing and lubricating. The vehicle was very fully described by us in our issues of Aug. 29th and Sept. 5th last, and does not therefore require further treatment. It has a 4-cylinder Aster engine, fitted with atmospheric inlet-valves. The wheel-base is 7 ft. 6 in., the track 4 ft. 2 in., and the wheels were shod with 34 in. by 4¼ in. by 4¾ in. Collier tyres.

16-h.p. Lanchester (No. 109).—A good deal of trouble was experienced on the first day, occasioning a loss of 31 reliability marks and 42 in the repair tent, followed the next day by withdrawal, owing to overheating of the engine. As already mentioned in conjunction with the 10-h.p. vehicle (No. 87), the makers attribute the cause to the employment of a new form of fly wheel driving the cooling fans, which proved unsuccessful on both cars. The vehicle is similar to the smaller model, but has a more powerful engine.

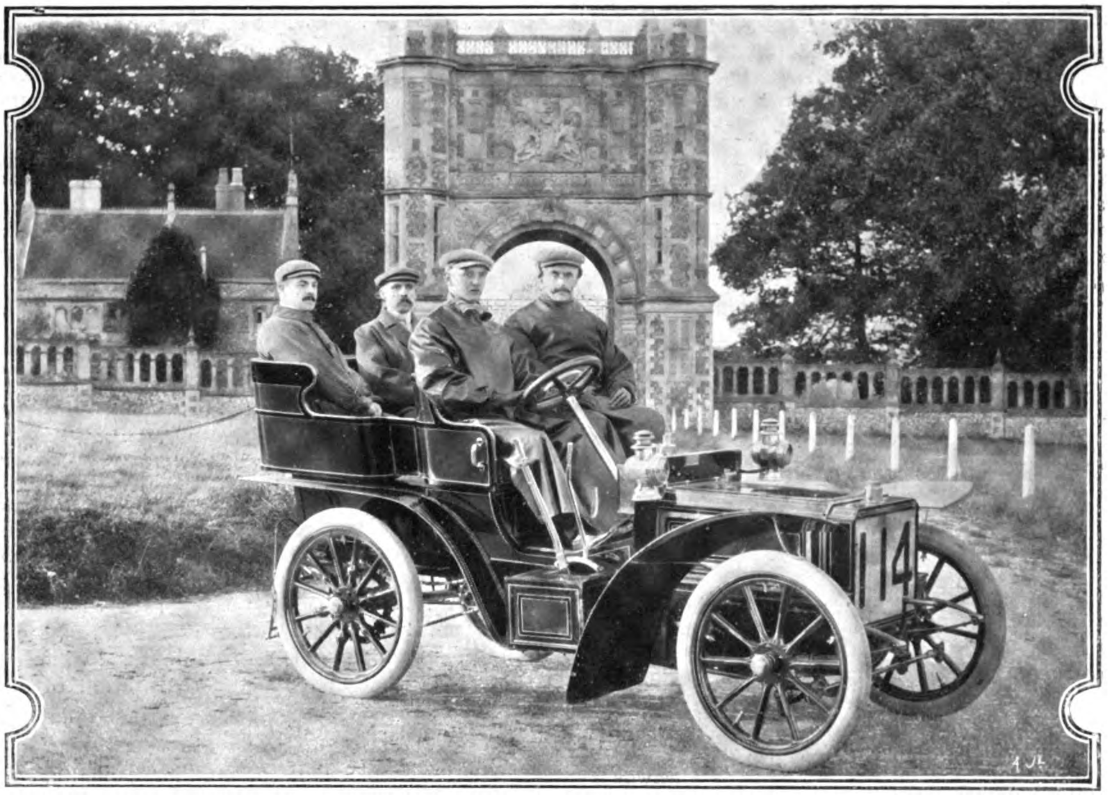
20-h.p. Spyker (No. 111).—Owing to the gear being out of order, this car had to retire when close to the Palace, towards the end of the first day's run. For a description of its general characteristics, we would refer our readers to our article dealing with the Spyker cars, which appears on another page this week.

14-h.p. Renault (No. 113).—A good deal of trouble was experienced during the first seven days, ignition being responsible for no less than 102 marks, the gear for 8 and the tyres for 10, besides which 11 marks were lost on one occasion for lubrication on the road. The ignition, too, caused the loss of garage marks on several occasions. The car has a tubular main frame and under-frame, an internal cone-clutch, and a live axle drive. The 4-cylinder engine has mechanically-operated inlet valves arranged on the same side as the exhaust-valves. It runs at a normal speed of 900 revs. per min., and has a compression of about 65 lbs. per square inch. A high-tension system of ignition is employed. The carburettor is of the float-feed type, and the water is circulated through radiators, forming the sides of the bonnet, on the thermo-syphon system. Ball bearings are used in the back axle, and for the front wheels. Michelin tyres, 870 by 90 mm., are fitted.

14-18-h.p. Martini (No. 114).—This vehicle, which gained a special gold medal in its class, made 6 non-stop runs, and on each of the other days lost 2 marks owing to a stoppage in the petrol feed. Except for replenishing and lubricating, no garage marks were deducted. It resembles the Rochet-Schneider cars, which we have already described (AUTOMOTOR JOURNAL, May 9th, 1903), and is made under license from those manufacturers. It was fitted with Simms-Bosch rotary magneto ignition, and with the Martini patent honeycomb radiator, both of which were entered separately under Section II in the trials. The magneto runs at a slow speed, and is driven by equal sized spur wheels from the cam-shaft, the shield revolving between the stationary armature and the magnets. The time of ignition was not variable. The honeycomb radiator has large top and bottom reservoirs, which are connected together by flat thin brass tubes bent into a zig-zag shape. A single row of these is placed vertically, each tube connecting the reservoirs together, and presenting its edge in the direction of travel; no fins are fitted to the tubes. The car has a wheel base of a little over 7 ft., and the track is 4 ft. 1 in. The wheels run on ball bearings, and were shod with Clipper Continental tyres 870 by 90 mm.

10-h.p. White Steam Car (No. 116).—This vehicle would have scored non-stop runs on each of the eight days but for a tyre trouble causing a loss of 5 marks. In garage a further 14 was lost for tyres, and a certain number for cleaning and starting, in addition to those for replenishing and lubricating. It only differs from the smaller vehicle (No. 84) in that it has larger tank capacities, and that special arrangements are made for improving the efficiency by preventing heat losses by radiation from the hot parts. A water tank is fixed inside the tonneau against the back of the front seat. A special silver medal was awarded for the low water consumption.

12-h.p. Humber (No. 117).—On the first day one mark was lost owing to the engine having stopped, and on the following day the car retired at Mayfield with a stripped driving pinion. It is constructed on the usual Humber lines, with tubular frame, live



1,000 MILES RELIABILITY TRIAL.—The 14-18.h.p. Martini Petrol Car (No. 114).

axle drive, and an under-frame for carrying the gear-box. The four-cylinder engine has atmospheric inlets, high tension ignition, and a Longuemare carburettor. Its normal speed is 900 revolutions per minute, the compression is about 75 lbs. per square inch, and at a speed of 1,250 r.p.m. it develops about 18 b.h.p. The wheel base is 8 ft., the track 4 ft. 3 in., and the wheels, which run on plain bearings, have 870 by 90 mm. Michelin tyres.

24-h.p. Darracq (No. 118).—Although only two non-stop runs were recorded, similar runs on two other days were only prevented by a broken wire, costing 2 marks, on one occasion, and a tyre trouble (5 marks) on another. On the other three days the accumulators were responsible for a total loss of 56 marks, a coil for 46, the change-speed-lever for 25, a stoppage on Westerham Hill for 4, water in the carburettor for 5, the gear for 1, and replenishing for 4 reliability marks. In garage, the ignition caused 6 marks to be lost, and a few more went for minor adjustments—apart from replenishing and lubricating. This vehicle is in general respects similar to the 12-h.p. model (No. 64), but has a pressed steel frame, and the mechanically-operated inlet-valves on the 4-cylinder engine are arranged on the same side as the exhaust-valves. A fan-cooled honeycomb radiator forms the front of the bonnet. The wheels run on ball-bearings, and have Clincher-Michelin tyres, 870 by 90 mm.

(*To be concluded.*)

The Intrepid Steam 'Bus.

ALL persons who have the progress of the self-propelled public service vehicle at heart, and more particularly all to whom the gallant fight which steam is making in the severe competition with petrol, will be delighted to read of the gallant doings of the Clarkson omnibus at Torquay. The Clarkson 'bus, to which we have referred in back numbers of the Journal, and which has been running in that town for some time past, has done so well that the Motor Omnibus Company have decided to add three more 'buses to their stud. When the first of this order arrives it will be put upon the Strand and Tor Railway Station route, while further routes will doubtless be found for the others. The existing "Chelmsford" (Clarkson) 'bus has earned golden opinions locally by its sturdy fronting of the storm on Saturday week last. A correspondent in the local paper was more than impressed by its performances. It did not, he said, miss a single run during that day, when at times nothing could live on the sea-front but the motor 'bus and the lifeboat. It actually charged the waves breaking over the road, and one passenger who had the hardihood to ride beside the driver (and the pluck and determination of both of them must have been considerable) is stated (not on oath) to have arrived at Cockington with some shrimps in his pocket and a muffler of seaweed round his neck. Whether the shrimps were boiled or whether they were in his pocket when he started is not stated, but the seaweed is better evidence of the usage to which the elements had subjected the steam 'bus. Mr. Clarkson has worked so long, so pertinaciously, and so patiently at the development of a satisfactory steam vehicle for public service requirements that we feel sure all our readers will feel delighted at the excellent results being obtained with his vehicle at Torquay.

ALTHOUGH comparatively very little time has elapsed since the regulations of the Local Government Board in regard to motor cars under the new Act were known, it is astonishing the number of firms who are already in a position to supply numbers, lamps, &c., specially adapted to meet the requirements under the regulations. Some of the devices are extremely ingenious and compact.

RACES, RECORDS, AND TRIALS.

GORDON-BENNETT CUP RACE.

FRIDAY, June 17th, has been definitely fixed as the date for the running of the Gordon-Bennett Race. This day immediately precedes the commencement of the Kiel Regatta, at which the German Emperor is invariably present, and it is hoped that this is a sure indication of the intention of His Majesty to witness in person the great race.

Eight nations in all have signified their intention of participating in this race in 1904, the latest to inscribe its name being Switzerland. Besides that country there are Germany (the present holders of the Cup), Great Britain, France, Austria, Belgium, Italy, and America, which have given notice of entry, so that there may be a total of 24 cars starting over the Taunus course to secure the trophy. The entry of Switzerland has come somewhat as a surprise, and it has been taken for granted that the car to represent this little country would be a Martini. This, however, does not appear primarily to have been the reason for the entry, as an 8-cylinder 80-h.p. Dufaux racing car is being completed for the express purpose of taking part in this race. The driver will be Frederic Dufaux, and the vehicle is being constructed by MM. Piccard, Pictet and Co., of Geneva.

Holland is expected to be added to the list of challengers, in which case a Spyker car will no doubt represent that country.

Considerable doubt appears to exist in regard to what American cars will take part on behalf of the United States, but one entry is clear, viz., that of Mr. Alden Sampson, of Pittsfield, Mass., and a Peerless car is also spoken of. In the case of Sampson's vehicle his connection with the Moyea Company suggested that it was a car of this make, but from particulars published there seems unlikely that this is the case, but that the vehicle is one of special and at present unknown construction.

Since our last issue the entry list for the French Eliminating Trials has received six additions, viz., the Darracq firm, the Mors Company, the Gobron-Brillié Company, G. Richard-Brazier, and Hotchkiss, each of whom will have three vehicles running. Two Turcat Mery's make up the list. Two of the Mors cars will be driven by Salleron and Leger. The Panhard firm will probably be represented by Chevalier René de Knyff, Maurice Farman, and Henri Farman. Two of the Hotchkiss cars will be driven by H. and A. Fournier. As the time of final entry on behalf of France did not expire until Thursday of this week, no doubt there will be further entries to chronicle next week. Amongst the likely firms to come forward are the Gardner-Serpollet and Renault.

Belgium, as already intimated, will have to place their chances on the Pipe car, and although in their case there will be no contest proper to determine the runner in the final race, it is proposed that all the preliminary tests should nevertheless be carried through beforehand to enable any possible improvements to be made in time for the race.

For Great Britain the names of the entered cars and drivers at present publicly known are: for the Napier team, Messrs. S. F. Edge, Mark Mayhew, and John Hargreaves, and Mr. J. E. Hutton on one of the special Hutton cars at present under construction, and which will be first exhibited at the Crystal Palace Show in February. Until officially announced we refrain from mentioning the names of other British firms likely to enter their names for the Preliminary Trials. Although Mr. Charles Jarrott may drive a De Dietrich car in the French Eliminating Trials, it is by no means certain that in the actual race he may not be found in the British team.

During the Homburg week a race for cars driven by ladies is promised as one of the special attractions.

ATTENTION is drawn by the Technical Secretary of the Automobile Club to the excellent opportunity offered to manufacturers to obtain a certificate for 100 miles non-stop runs, together with a record of fuel consumed and speed on hill-climbs by entering in the Quarterly Trials which have now been held regularly by the Club for some years. Particularly is this point emphasised in regard to light cars for which an enormous demand by the public is now steadily growing. The next Trial will be on February 12th, the last day for entry being February 6th. The entrance fee is ten guineas, of which six is returnable if the vehicle actually starts. This fee includes the registration of driver and vehicle.

A PRIVATE piece of road, either asphalte, cement, or wood, for carrying out the Side-slip Trials of the Automobile Club, is urgently needed. If possible, this road should be within ten miles of London, and any of our readers who may know of such a piece of road available for this purpose should communicate either with us or the Technical Secretary of the Automobile Club, so that this very important test may be carried out to the ultimate benefit of the entire automobile community.

SIDE-SLIP competitions, as applied to motor cycles, are to be a feature of the coming season under the auspices of the Auto-Cycle Club. March or April will probably be the date of the tests.

W. K. VANDERBILT, JUN., has entered for the Florida races from January 26th to 29th with his 100-h.p. Mercedes car.

DURING the spring a competition is announced, to be held under the auspices of the *Vélo*, for voiturettes ranging in value from £80 to £120.

IT is proposed amongst the leading American automobilists to shortly call a conference of owners and drivers to reconsider the rules governing automobile racing in the United States, with a view to revising them in many particulars.

THE Anti-Skid Trial being organised in France by the Seine-et-Oise Club will be held over a distance of about 900 kiloms. between February 23rd and 28th. Only 4-seated cars, weighing at least 300 kilogs. fully laden, will be qualified to take part. A maximum of 500 marks will be apportioned to various points in the tests, upon which the judges will base their decisions.

A NOVEL competition will be inaugurated by the Moto Club of Belgium, in connection with the Brussels Salon. Prizes are offered for the best produced automobile catalogues under 3 categories, viz., those produced by merchants and constructors of (1) cars, voiturettes, and motor bicycles, (2) accessories, parts, and pneumatics, (3) motoring clothes, goggles, &c. The winning catalogues will be exhibited on the stand of the Moto Club of Belgium.

THE suggestion of having a tourist run on the occasion of the St. Louis Exhibition this year has taken definite shape by a proposal of the American Automobile Association sent round to all the American clubs and the members of the Association. The scheme is that each tourist will travel as he sees fit, subject to a main route being planned so that they can keep together and meet each night. This trunk line route will be mapped out from Boston through Albany, Buffalo, and Cleveland to Chicago, and from there south to St. Louis, and clubs will be invited to join from other points and help to swell the cavalcade. The daily runs will be about 100 miles, and to provide for unforeseen delays by weather, &c., two or three days will be allowed for in order to reach St. Louis in good time for the automobile week which is to be arranged in that city. The Delmar Track is to be utilised for the week's racing, and it is proposed that the tourists shall form an automobile camp inside this track for the entire week.

MONACO MOTOR BOAT RACES.

THE full regulations are now issued in connection with this important event for next season. The races, which will take place during the first fortnight of April, are organised by the International Sporting Club in connection with *L'Auto*, and form part of, and are dependent upon, the Yachting Exhibition, which will be held at Monaco immediately prior to the races. Boats entitled to take part in the race must have been shown at this Exhibition previously. Under the rules boats are qualified having the maximum length of 25 metres (82·022 ft.) and propelled by any of the following four systems: (1) Explosion motors of all sorts; (2) Electric motors of all systems in which the source of energy employed is self contained on the boat; (3) Steam or vapour motors in which the vaporisation is instantaneous, and the fire or burners are automatic in action; (4) Combustion motors using vaporised petroleum.

100,000 francs in money prizes besides cups and trophies will be offered. In the money prizes 10 per cent. will be reserved for the constructors of the hull, and 10 per cent. for the constructors of the motor.

Boats only which have been on view at the Exhibition for eight days (192 hours) terminating at midnight on the evening before the race is held, will be admitted for competition.

The qualification of the boats are as follows:—

The Racers.—These will be divided into four classes, according to the length of the hull (measuring from end to end between perpendiculars, exclusive of the rudder), and the power of the motors. For the explosion motors the power will be calculated by cylinder capacity under the following formula:—

$$\text{Cylinder capacity} = \frac{\Pi D^2 \times C \times N}{4}$$

in which D = the diameter or bore of the cylinder, C = the stroke of the piston, N = the number of cylinders; Π is taken at a value of 3,1416.

The racers will be classified as follows:—

Series.	Length.	Cylinder Capacity.
1	up to 8 metres (26·247 feet)	7 litres.
2	,, 8–12 ,, (39·371 ,,)	15 ,,
3	,, 12–18 ,, (59·056 ,,)	30 ,,

For this year the boats beyond 18 metres will not be classed. English 40-foot boats for 1904 will be accepted in the 12 metre class, and 60-feet English boats in the 18 metre class. A special class will be made for motors using petroleum or heavy oil for fuel, in which the point of combustion is higher than lamp oil (35° Centigrade), but having the same cylinder capacity as the petrol motors.

Motors other than Explosion Motors.—All motors other than explosion motors in which no comparison exists between their power and the measurement of the cylinders will be classed separately, and will run separately and no limit will be placed upon the power of the motor. In steam motors exhaust direct to atmosphere is prohibited. In this class the series will be:—

1, Less than 8 metres in length; 2, Less than 12 metres; 3, Less than 18 metres.

Cruisers or Pleasure Boats.—These will be classified in five series according to their length and according to the power of their motors. All cruisers must be proper passenger boats with a certain amount of free-board and a proper seating capacity. The detailed classifications will be as follows: (1) By the length of the hull from end to end without rudder, and (2) by the cylinder capacity:—

Series.		Cylinder.
1.	Up to 6½ metres (21·325 feet)	2½ litres
2.	6½ metres to 8 metres	3¾ ,,
3.	8 to 12 metres	7½ ,,
4.	12 to 18 metres	15 ,,

Boats beyond 18 metres not admitted.

and (3) according to the number of passengers.

The pleasure boats are to provide for their guaranteed number of adult passengers sufficient accommodation according to the length of the boat expressed in metres, every fraction of a metre to count as a full metre. The passengers may be replaced by ballast in the proportion of 70 kilogs. for each passenger omitted, but the amount of space provided for the passengers must not be on that account diminished. The amount of space equivalent to ·45 of a metre in all three dimensions must be provided for each passenger carried.

Height of the free-board.—In the case of undecked boats or boats partly decked, the co-efficient of safety must be the height of the free-board amidships. The latter must never be less, when the boat is laden, than ·2 m. + 0·03 L (L being the length of the hull properly so called).

The free-board is to be measured amidships with the vessel fully laden and provided with all its appurtenances, including fuel. The free-board is to be considered as ending with the hull properly so called.

Pinnaces.—Boats may compete as pinnaces which do not exceed 6·5 metres, and do not weigh more than 400 kilogs., in running order, but without water, fuel, or tools. These pinnaces must carry at least four persons, and must be capable of going through their tests in all weathers, tempests excepted.

Fishing Boats.—Any boat is entitled to enter as a fishing boat which is inscribed as such on a maritime register since November 1st, 1903.

Auxiliary Boats.—Cruisers with mechanical motive power, and all sailing boats which do not draw more than ·66 m. of water may compete as auxiliary boats, but false keels are prohibited.

The races will extend over eight days, of which the following is the **Programme**:—Every morning the Commissary of the Races will have the right to decide whether the races are to take place or not. A cannon will be discharged an hour before the races commence.

The points at which the cruisers are to turn will be settled by arrangement with the local authorities.

1st Day.—1. Series 1 of the Racers; distance, about 150 kiloms., six times round a triangle of 25 kiloms.; maximum time to qualify, 10 hours.

2. Series 1 of the Cruisers; distance, about 60 kiloms.; time, 10 hours.

2nd Day.—1. Series 2 of Racers; distance, 200 kiloms.; time, 10 hours.

2. Series 2 of Cruisers; distance, 75 kiloms.; time, 10 hours.

3rd Day.—1. Series 3 of Cruisers; distance, 100 kiloms.; time, 10 hours.

2. Fishing Boats; distance, 60 kiloms. Sails and motor may be employed at the same time.

4th Day.—1. Series 3 of Racers; distance, 250 kiloms.; time, 10 hours.

2. Series 4 of Cruisers; distance, 125 kiloms; time, 10 hours.

5th Day.—Open race for all boats employing fuel of which the flash point is not less than that of ordinary lamp oil (35°), not including explosion engines:—

1.	For boats of less than 8 metres,	distance	150	kiloms.
2.	,, from 8 to 12 ,,	,,	200	,,
3.	,, ,, 12 to 18 ,,	,,	250	,,

Maximum time, 10 hours.

6th Day.—1. General handicap for all racing boats of all systems previously qualified in their categories. Distance 50 kiloms.

2. Handicap, Monaco-Nice and back, for all cruisers qualified by the race in their category. Distance, about 70 kiloms.

3. Race of rowing boats. The rowing boats will be supposed to start from a yacht, enter the roads and turn round a buoy. They are to leave a letter at the quay and return on board the yacht from which they are supposed to start. A certain time for neutralisation,

which must not be exceeded, will be allowed. Total distance, 30 kiloms.

7th Day.—1. General handicap for all racing boats of all systems qualified in their categories. Distance, 200 kiloms.; maximum time allowance, 10 hours.

2. Race for auxiliary boats; first test; sailing 30 kiloms., the motor being in readiness to act, followed by 50 kiloms. with the motor running and the sails furled. Classification by time allowance. The categories will be the same as for the cruisers.

8th Day.—Race over a kilometre and nautical mile. Classification will be general and by categories. This race is exclusively reserved for boats that have finished in the general races within the time allowed. The classing will be by adding the times for the kilometre and the nautical mile together.

ALREADY fifty-two entries have been notified for the Monaco Motor Boat Races, and twenty-five have actually fulfilled the formal conditions required. Amongst these in the Racers section are boats by Darracq, Hotchkiss, Peugeot, Mercedes (two), Bayard-Clement, Napier (two); and in the Cruisers three boats by Peugeot, a F.I.A.T., a Bayard-Clement, and one by De Dietrich. Entries at single fees closed on December 31st.

Two Napier racing boats have already been entered for the "British International Cup for Motor Boats" (Harmsworth Cup), these being again the first entries for this important event. These two boats are the 40-foot craft of 100-h.p. belonging to Mr. S. F. Edge, and the 35-foot boat of 60-h.p. A heavy list of foreign competitors is expected to enter, and we hope to see a number of other British-built racers coming forward to contest on behalf of Great Britain for the honour of continuing to hold the prize in the United Kingdom. In the rules governing this race, in addition to the change in the title of the race, several other modifications of the rules have been made. Each vessel must carry not less than two hands, of whom the helmsman shall be a member of the competing club, and all hands must be natives or naturalised subjects of the country which they represent. If more than two boats are competing for the cup not more than one boat representing each country will race together at any one time. August is the likely date for the race, and the entrance fee for British defenders is placed at £20, of which £10 will be returnable in the event of the vessel actually taking part.

THE holding of a motor boat race from Calais to Dover, which we announced about last August as likely to take place during 1904, is now confirmed by the Automobile Yachting Commission appointed by the A.C. de France.

IN America the American Power Boat Association are helping to promote the popularity of motor boat racing. They have determined to offer a valuable silver trophy for an International Competition to be held in June or July next, and annually thereafter. Thirty yacht clubs forming its membership will contribute to this. Competitors in America must be members of the Yacht Clubs forming this Association, but all foreign owners of racing motor boats will be invited to enter for the race. The course will be between 20 and 40 miles long, either on Long Island Sound or the Hudson River. The A.C. of America are also seriously considering the question of taking an active interest in motor boat racing in the future.

CLUB DOINGS.

Burnley and District Automobile Club.—Mainly as a result of the conciliatory attitude and diplomatic action of the Burnley and District Automobile Club, which we reported on December 12th, the local authorities are not likely to ask for unnecessary restrictions under the new Act now in force. The letter addressed by the club last month to the Lancashire County Council has had an excellent effect, resulting in an official communication being sent to each of the local councils, in which it is stated that the Lancashire Main Roads and Bridges Committee, after deliberating upon the new regulations, resolved that while being of opinion that the safety of the public will in most cases be sufficiently protected by Section I of the Motor Car Act, 1903, are prepared to consider the application of any local authority for a ten mile an hour limit, and will investigate each case upon its merits and report to the Local Government Board their decision. They further announce that the proposed conference of local authorities will not now be held.

ON Tuesday next the Motor Cycling Club hold their annual dinner, and on the 28th inst. the annual general meeting of the club will be held.

MESSRS. BENNETT AND CARLISLE'S Liverpool business has been acquired by the Road Carrying Company, Limited, of Liverpool, as from the 1st January.

MR. DOUGLAS MACKENZIE has been awarded the President's Gold Medal of the Society of Engineers for his Paper, which he read before the Society, on "Motor Transport for Goods."

THE enormous number of motor cars to be seen not only travelling in and out of London during the recent Christmas holidays, but throughout the country, was a revelation even to the greatest enthusiast and experienced automobilist.

MR. U. STRATTON, late of Compton Grange, near Wolverhampton, and of Bexhill-on-Sea, has been appointed London manager of the Daimler Motor Company, Limited. Mr. Stratton's experience during the past years as an enthusiastic automobilist, added to his considerable business experience, should render him an extremely valuable addition to the Daimler Company's staff.

IN contrast to the general feeling amongst London boroughs a discordant note comes from Southwark in reply to the London County Council's enquiry as to "dangerous corners" at cross-roads and precipitous places where it is deemed necessary that warning signposts should be erected. The reply of the Town Clerk, under the instructions of the Southwark Borough Council, is: "That, in our opinion, the whole of the area under our control is dangerous for motor car traffic."

WE have this year received a more than usually large number of Christmas cards, souvenirs, and other seasonable greetings. Chief amongst these we would refer to the very artistic production sent us by Mr. Henry Norman, M.P., to the more elaborate little booklet by Messrs. Jarrott and Letts, to the ornamental design of Mr. Frank Morriss wishing us "good lubrication, circulation, and acceleration," for the coming year, and Mr. Edward Butler's card, illustrated by the tricycle which appears on another page.

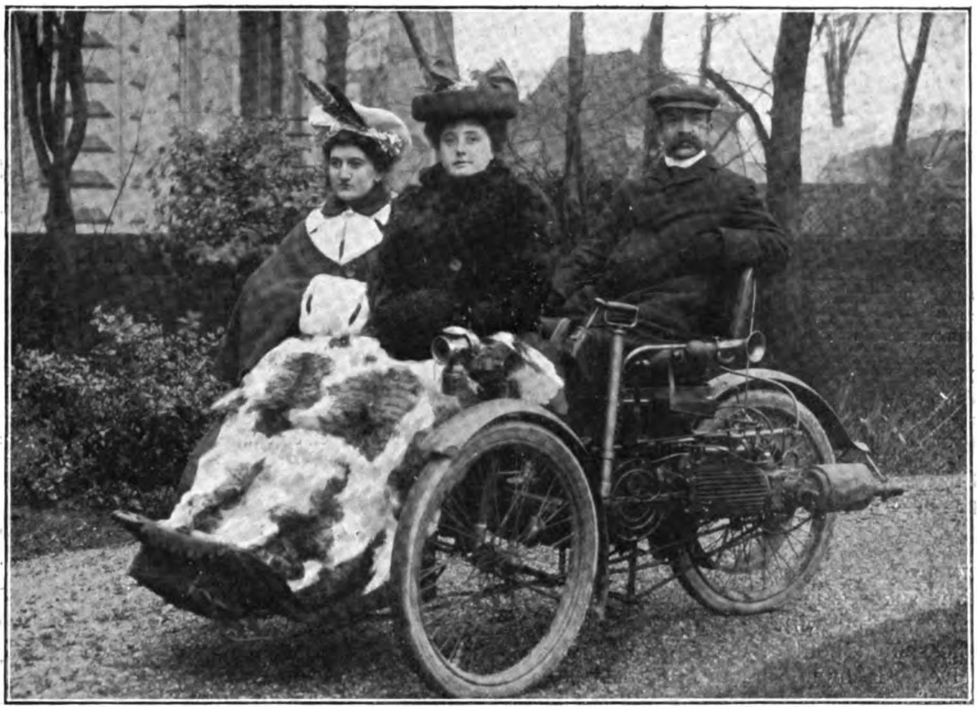
THE automobile development of Ireland is progressing satisfactorily, the latest feature being the proposed establishment of a public motor car service between Dublin and the neighbouring small town of Swords, and a company has been formed for the purpose. At least one car, having a seating capacity of twenty passengers, is to be run daily between the two places, and other motor vehicles for goods transport are also to be supplied. It might be interesting if the undertakers were to take a hint from the old Irish "longcar" and adopt that type of body for the purpose. It is one of the best ways of getting a large number of persons into a small compass with comfort to themselves, and would have the merit of possessing a national character as well.

NEARLY all visitors to the Paris Salon have commented on the marked increase in numbers and improvement in building of commercial vehicles, notably those of the delivery van class. This branch of the industry is bound to develop enormously in the near future, and the only wonder that can be felt on the subject is that the development should have been so long in coming. Mr. Frank Morris, of King's Lynn, writes to us, pointing out that damage has to a certain extent been done to this branch by many manufacturers providing delivery vans in which the running gear was practically identical with that of pleasure vehicles designed for much lighter work, and that the result has been to prejudice purchasers against this type of vehicle. He very properly points out that the demand for delivery vans will rapidly become enormous if satisfactory vehicles are supplied, and counsels manufacturers not to spoil the market by continuing to build vehicles of this class on too delicate lines. It is good counsel, and perhaps it is as well that attention should again be drawn to the subject, as it may enable users to locate the source of some of their troubles in the past, and to feel assured that in the present position of the industry there is little probability of such troubles being again experienced.

"AUTONAUTIQUE" is a new word by *L'Auto* for motor boat racing.

OUR German contemporary, the *Allegemeine Automobil-Zeitung*, has in a novel manner got over the difficulty of publishing during the Christmas holidays by issuing two weeks' numbers in one.

AUTOMOBILISM has served a good purpose in affording relief to officers of the French Mercantile Marine, who have adopted the motor goggle mask to aid them in navigation in excessively bad weather.



MR. EDWARD BUTLER, M.I.M.E.—a well-known Pioneer in the Industry—on his Bollée tricycle, the engine on which is fitted with his special Rotary-Valve mechanism. This vehicle has run many hundreds of miles fitted with this mechanism, and has proved its practical success.

DURING the Turin Automobile Salon it is announced by the Italian Government that no Customs duty will be charged on foreign vehicles entering for the exhibition.

UPON appeal, the anti-automobilist Mayor of Brussels, M. Demot, has been successful in obtaining a reversal of the judgment given that a decree issued by him, confining the speed of automobiles in the city to five kiloms. per hour, was illegally issued. M. Demot is now, no doubt, happy in the knowledge that he may claim hereafter to be included in the list of narrow-minded bigots who have temporarily helped to stem the progress of the automobile industry.

MR. R. A. FLIESS, an American electrician, has brought out what appears to be a really very good idea to keep the fingers of automobile drivers warm in very cold weather. He arranges resistance wires, heated by an electric current, inside the steering wheel, the current being so proportioned as to keep the substance of the wheel at a nice moderately warm temperature. He claims that a very trifling expenditure of current is sufficient for this purpose, which would probably be the case, and in all cars fitted with dynamo attachment for ignition purposes, the difficulty of applying the invention should not be serious. There are many points of view from which a dynamo attachment has advantages, and if this little apparatus should be found generally serviceable, its application will form an additional inducement to motor car builders to employ the dynamo for supplying the current needed for ignition purposes.

THE Extra Parliamentary Commission, which is now sitting in France to consider and draw up proposals for the regulation of automobile traffic, is receiving reports from various bodies and individuals. M. Paul Escudier, on behalf of the Municipal Council of Paris, has presented a lengthy report which concludes by proposing that the Municipal Council should submit to the Commission the following suggestions as embodying the measures which it looks upon as most suited to regulate automobile traffic in the French metropolis. The chief points are :—

To warn and stop drivers when their vehicles diffuse an unusual amount of unpleasant smoke, forbid the excessive use of the hooter, and prohibit the use of automobiles without effective mufflers.

To insist upon severe examination before issuing driving permits.

Not to enforce any particular speed.

Automobiles free from noise, smoke, and odour to be admitted to the Acacia Drive in the Bois de Boulogne, a moderate pace only to be indulged in throughout both the Bois de Boulogne and the Bois de Vincennes.

Drivers should at once stop when notified by means of a special whistle. Infractions of the rules to be punished not by prison but by fine, if no accident has been caused, such fines to be exacted in some simple and expeditious manner.

The lowering of the duty on petrol is strongly recommended, it being considered that more revenue will result to the Municipal Exchequer owing to the increased consumption that will follow.

M. JOUSSELIN even goes further in consideration for automobilists, and suggests in a separate report that the police who are entrusted with the duty of regulating motor car traffic should hold certificates as motor car drivers themselves. If found practicable this scheme would have much to commend it. A fellow-feeling would be likely to make the police kinder to automobilists than they hitherto have been, and the expert knowledge that personal experience alone can give would often prevent them from making mistakes, as, for instance, jumping to the conclusion that a motorist was driving recklessly when he might really be driving with consummate skill and care.

A REALLY valuable addition to automobile catalogue literature has been made by Mr. Oscar C. Selbach, of 66 and 66A, Great Russell Street, W.C. In the new publication just to hand consisting of 182 pages, practically every form of "parts" and accessories will be found set forth in the very clearest possible manner, almost without exception illustrations accompanying the descriptive matter. This book should prove of considerable value for reference purposes to all owners of cars and dealers, and we recommend our readers to apply to Mr. Selbach for a copy of this excellent work. Every imaginable article likely to prove of practical value is included, ranging from the smallest tools, nuts, &c., up to engines, frames, and complete chassis.

LAW REPORTS.

Court of Bankruptcy.—Re A. E. Hodgson.—The first meeting of creditors was held under the failure of Albert Edward Hodgson, of Victoria Street, Westminster. Debtor formerly carried on the business of a brass founder and coppersmith at Halifax, which business was acquired in 1895 by the Eclipse Brass and Copper Company, Limited. Between 1897 and 1900 he experimented at Halifax in the building of motor-cars, and in the latter year his works with others were taken over by the British Power Traction and Lighting Company, Limited, with a capital of £70,000. The debtor received £15,000 in shares, and also took up some of the debentures and purchased the freehold of the company's works. He also acted as a director, and became joint guarantor for advances from the bank. In 1897 the debtor promoted the Bridge Hotel and Theatre Company (Darlington), Limited, with a capital of £40,000, to acquire an hotel and theatre at Darlington, the freehold of which he had purchased. In the spring of 1902 the debtor removed from Haxby to London and started business as a motor dealer and agent at 94, Victoria Street, Westminster. He sold this business last spring, and has since been engaged in selling cars on commission and assisting in the reconstruction of the British Power Company. The accounts showed liabilities £35,223, of which £24,216 is expected to rank, and assets £50,000, consisting partly of claims in a pending action for breach of contract brought by the debtor in connection with his motor business. He attributes his present position to liabilities on guarantees given by him in connection with the British Power Company, and to moneys expended under the agreement which is the subject of the pending action. The meeting was adjourned to January 4th.

DOINGS OF PUBLIC COMPANIES.

AMONGST companies struck off the register during December are the following :—

Automobiles (Lawsons), Limited.
Automobile Review Syndicate, Limited.
Daimler Wagon Company, Limited.
East Coast Automobile Company, Limited.
Electric Propulsion, Limited.
Idris Wheel Syndicate, Limited.
New Century Motor Syndicate, Limited.
Reading and District Motor Car Company, Limited.
Schwanemeyer Motor Manufacturing Company, Limited.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Asbury (Limited).—Capital, £500 in £1 shares. Object, to adopt an agreement with R. V. Asbury, and to carry on the business of manufacturers of and dealers in cycles, motor cycles, and motor cars, &c.

Cadogan Syndicate (Limited).—Capital, £200 in 4s. shares. Object, to carry on the business of makers of all kinds of vehicles and motors and accessories thereto, &c.

Cosi Car Company (Limited), 53, Warwick Street, W.—Capital, £5,000 in £10 shares. Object, to carry on business as manufacturers and dealers in motor cycles, &c. First directors, E. Klaber, A. D. Klaber, and W. T. Smedley.

Edlin-Sinclair Tyre Company (Limited), 26, Sherlock Street, Birmingham.—Capital, £5,000 in £1 shares. Object, to adopt an agreement with R. W. Edlin and F. Sinclair, and carry on business in pneumatic and other tyres, and wheels for motors, cycles, &c., and letters on hire of motor cars, &c. First directors, R. W. Edlin and F. Sinclair.

Kent Motor Company (Limited), 144, High Street, Rochester.—Capital, £5,000 in £1 shares. Object, to acquire the business of motor car proprietors and motor engineers, carried on by H. L. Cosh, at Gravesend, and by G. Senior, at Rochester. First directors, R. L. Cosh (chairman), H. L. Cosh, and G. Senior.

Monarch Motor Syndicate (Limited), 59, Moorgate Street, E.C.—Capital, £500 in 1s. shares. Object, to manufacture and deal in oil, gas, electrical, and other motors, and engines of all kinds, &c.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

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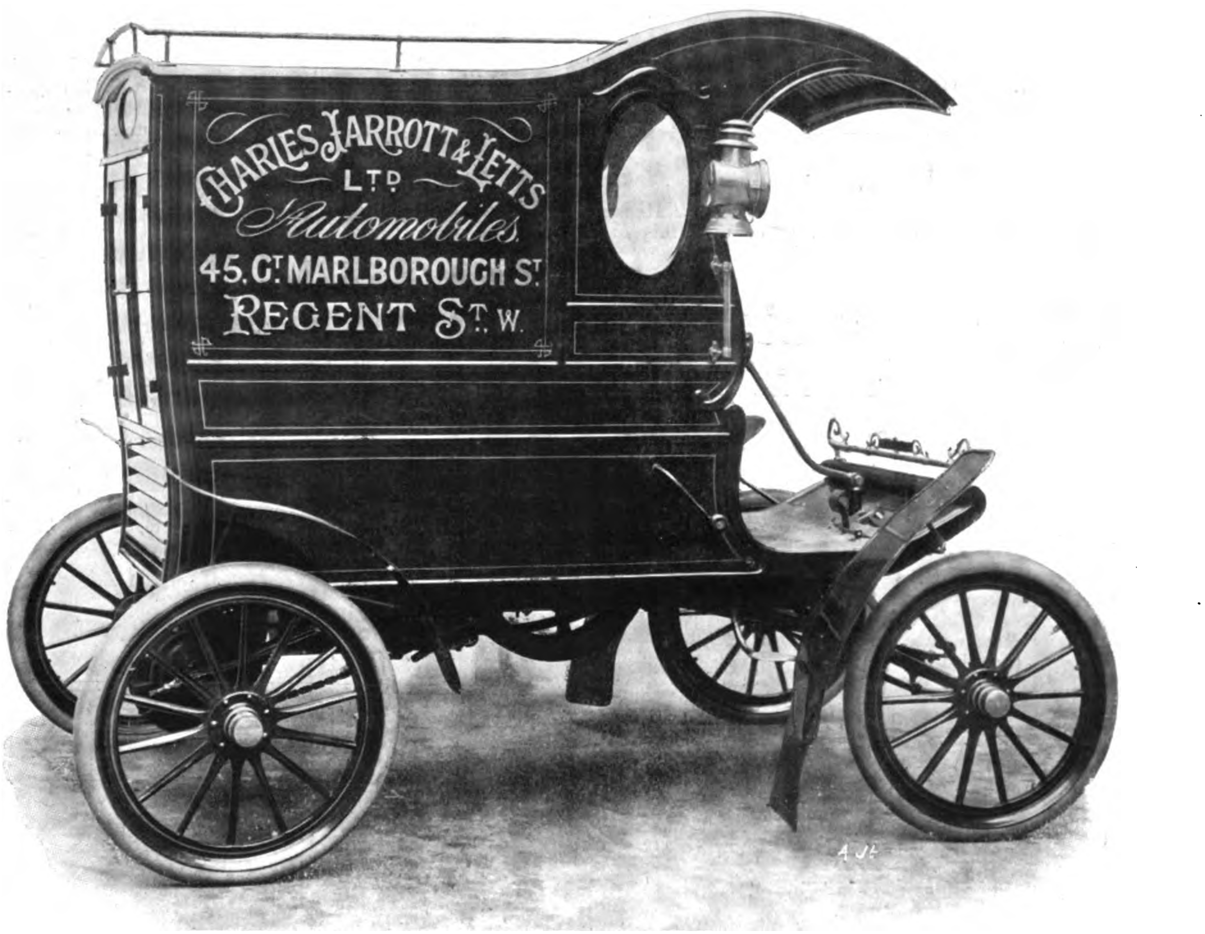

In this Oldsmobile Express Delivery Van, for loads of about 500 lbs., the chassis is the same as on the private vehicles, except that the springs are strengthened, and that the rear axle is geared somewhat lower. Space 3 feet by 3 feet by 3 feet is available for parcels, and the tanks hold sufficient fuel, water and oil for running 100 miles without refilling.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.

Jan. 13	"Motor Vehicles," by W. Norris (Liverpool Engineering Society).
*Jan. 14	Smoking Concert (Automobile Club).
Jan. 15–23	Leeds Cycle and Motor Show.
Jan. 18	"Reminiscences of the Road," by Mr. C. Jarrott (Scottish A.C.).
*Jan. 21	The Motor Car Act, by Earl Russell (A.G.C.B.I. Paper).
*Jan. 28	"Railway Companies and the Motor Problem," by Mr. George Montagu, M.P. (A.C.G.B.I., Paper.)
Feb. 1	Final Entry Day for British International Cup.
Feb. 1	"Evolution of Road-making in Scotland," by Mr. R. Drummond, C.E. (Scottish A.C.).
Feb. 2–6	Liverpool Cycle and Motor Show (St. George's Hall).
*Feb. 3	"Why Motor Cars" by "Cargill Gentry" (A.C.G.B.I. Paper).
Feb. 12–24	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
*Feb. 12	Quarterly 100 Miles Trial.
Feb. 23–27	Hull Cycle and Motor Show (Assembly Rooms).
Mar. 4	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12	Manchester Motor Show (St. James's Hall).
Mar. 19–26	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
Mar. 25–30	*Side-Slip Trials.
April or May	British Gordon-Bennett Race Eliminating Trials.
May 19–20	Glasgow-London Non-Stop Run.
June 1–7	Motor Bicycle Endurance Trial.
August	British International Cup for Motor Boats.
Sept. ...	*Reliability Trials.
Oct.–Nov.	*Light Van Trials (about 2,000 miles).

* Automobile Club of Great Britain and Ireland Events.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.

Jan. 16–23	Madison Square (New York) Show.
Jan. 23–Feb. 4	Brussels Automobile Salon.
Jan. 24	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Jan. 25–30	Ormond-Daytona Races (Florida).
Feb. ...	Tourist Run and Consumption Trial (*L'Auto*).
Feb. 3–6	Paris-Turin Tourist Run (*France Automobile*).
Feb. 6–13	Chicago Show.
Feb. 6–21	Turin Exhibition.
Feb. 23–27	Anti-Skid Trials at Versailles.
Mar. ...	Paris-Rome (*La France Automobile*).
Mar. 13–20	Cannes Automobile Week.
Mar. 19–27	Frankfort Exhibition.
Mar. 20–29	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26	Washington (U.S.A.) Auto Show.
Mar. 23–27	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17	Coupe Meyan (Motor Boats).
Apl. 18–23	Nice-Rome.
May ...	French Gordon-Bennett Race Eliminating Trials.
May ...	Guadarrama Hill Climb (A.C. Spain).
May 1–12	A.C. Bordelais Automobile Fortnight.
May 11–15	Milan Exhibition and Tourist Trial.
May 12	Perigueux Hill Climb (A.C. Dordogne).
May 12–15	Tours Tourist Trial.
May 14–15	Nantes-Croisic (Motor Boats), *Monde Sportif.*
May 16–23	Circuit National Belge.
May 23–31	Aix-les-Bains Week.
June ...	Circuit des Ardennes (A.C. Belgium).
June 7	Namur Week.
June 7	Spa Week.
June 17	Gordon-Bennett Race.
July ...	Mont-Cenis Hill Climb (A.C. Italy).
July ...	Speed Trials (*L'Auto*).
July 16–17	Ostende Motor Boat Races.
July 17	Antwerp-Ostende Motor Boat Run.
July 18–23	Ostende Week.
July 23–25	Lucerne Motor Boat Races.
Aug. 5–11	Paris–Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 15	Ventoux Hill Climb (Avignon).
Sept. ...	Deauville Automobile Meeting (*L'Auto*).
Sept. 2	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22	Leipzig Cycle and Motor Show.
Nov. 20	100 Kiloms. Trial (A.C. Algeria).
Dec. ...	Paris Salon.

NOTICE.—An 8-page Index to Volume VIII is issued gratis with this week's number.

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PASSING EVENTS.

County Councils and Urban Councils—A Contrast.

WHILE many of the Urban and Rural District Councils throughout the country are petitioning the County Councils, with feverish activity, to ask the Local Government Board to impose the 10-mile limit broadcast, it is satisfactory to find that the County Councils themselves, representing as they do a higher social stratum, and certainly a higher general level of intelligence, are in most cases disinclined to accede to the proposals, and are content to allow matters to take their course under the Act as it stands, and see, at any rate for some time, how things work. This is an encouraging symptom, and shows that the more responsible local authorities are awaking to the importance of the industry, and are taking a rational view of the situation. That this is not the case with the smaller bodies is evidenced by the fact that quite a number of them have proposed that the County Councils should ask for the imposition not of a 10-mile but of a 7-mile limit of speed. This is notably the case with the Watch Committee of Leeds, who have demanded a speed of 7 miles within a radius of one mile from the centre of the city. There is no power under the Act to impose a limit of 7 miles, and one would have thought that a body like the Watch Committee ought to have known it. In spite of having been visited by a deputation from the Yorkshire Automobile Club and the Leeds and District Motor Cycling Club, the Leeds Watch Committee persist in their absurdity, or, as the sympathetic Yorkshire *Daily Observer* says, "the Leeds Watch Committee remain firm." It is just possible that there may be some sort of conspiracy on foot to instruct all the local police to assert that any car proceeding beyond 7 miles an hour in the town is driving "in a manner which is dangerous to the public." If this be so, local automobilists had better keep a sharp look-out, as tactics of this kind would be a distinct abuse of the law, and we fancy that there are provisions in our enormous code of statutes to prevent individuals combining to pervert the application of an Act in such a way.

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The Horse Abandons Passive Resistance.

WE have all along had a shrewd suspicion that the terror which the horse has systematically assumed at the approach of a motor vehicle was all humbug. He is not such a fool, as a general rule, as the people who drive him imagine. His reasons for objecting to the automobile are deep and well considered. Now the murder is out. It is trade jealousy, pure and simple. He has been afraid that, with the introduction of the self-propelled vehicle, his occupation would be gone. He is not educated up to the point of realising that he might, on the whole, have a better time of it, if kept merely for purposes of pleasure, such as hunting or riding across country. Hitherto the horse has adopted the policy of simply pretending to be frightened, and thereby frightening to a still greater degree his riders or drivers, but, with the advent of the new Act and its increased speed limit, he has abandoned this policy, apparently regarding it as inadequate, and has commenced a policy of active hostility. Curiously enough, two motor cyclists have been the first victims of this change of tactics on the part of the horse. Possibly motor cyclists are comparatively easy victims. It is not so easy to attack successfully the driver or occupants of a full-sized high-powered car. Two motor cyclists were riding recently through Hucknall Torkard when they were furiously assaulted by a horse. The horse was standing in the road attached to a cart, and as soon as the motor cyclists had passed him, he set off after them. The faster they went the faster the horse galloped, till the motor cyclists, coming to a dangerous corner, which they feared taking at the speed, turned into a yard, and then the horse got them. He dashed in, breaking up the cart he was dragging behind him and tearing off his harness on the gate-post, and thus freed, he proceeded to deal with his two enemies. He kicked one of them on the head and injured the other's arm, the motor of the cycle (a tandem) being put out of action in the contest. This is a very ominous sign. Probably, owing to the spread of education, this enterprising horse has got hold of back numbers of the daily papers, and absorbed some of the correspondence that appeared during the Juggernaut outbreak. We trust it is an isolated case. If it is an indication of an approaching campaign on the part of horses, the lot of the motorist, particularly the motor cyclist, will be an unhappy one. Perhaps an offer will be made for the purchase of this enterprising animal by Sir Ralph Payne-Gallwey, Colonel Wisden, of Worthing, or Mr. George Hosking, of Ripley, butcher.

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The Un-Wisdom of Mere Funniness.

WE have the deepest sympathy with the journalist, particularly the daily journalist, who, in the prevailing depressing weather has to write something light, amusing, and attractive for the paper whose columns he illuminates. When, however, he happens to represent a paper which is avowedly friendly to the automobile movement, we must submit that he is not benefiting that movement by suggesting, however amusingly, that the carrying of a number on a motor car along the streets of the Metropolis renders all the occupants of the vehicle a butt for the cheap witticisms of 'bus drivers and cabbies, the jeers of the public generally, and a special object of suspicion to the police. Hitherto the number of motor vehicles which have performed their legal duty, got registered, and are carrying numbers, is comparatively small, so that a certain amount of attention is naturally attracted by a numbered car. When every car carries its number no attention will, of course, be attracted. We understand from the police that they have general instructions not to act in the matter for about a fortnight, but after that time they will proceed against all car owners whose vehicles do not conform to the law in regard to numbering. In the meantime, to hold up those automobilists who have been the first to do what is their legal duty to derision, even if good-humoured, is, we think, very mistaken policy.

Of course, some of them have rather courted comment by the amusing devices which they have adopted to provide their cars with their registered numbers in accordance with the Act, presumably before the finished number plates were ready. This zeal to conform to the statute is highly commendable, though it has very naturally on some occasions provoked good-natured chaff. It is very unfair to represent this as being the kind of thing that every automobilist with a proper and neat number-plate will be on all occasions called upon to run the gauntlet of.

Navigable Waterways.

THE progressive character of the French Chamber is well illustrated by the Bill recently introduced into that assembly for carrying out repairs in the navigable waterways and for improving canals, rivers and ports. The amount voted by the Chamber was 700 million francs, though this was subsequently reduced by the Senate to 300 million francs. Partially disused waterways of France are numerous enough, but there are a large number of derelict canals in this country, too, which have fallen into decay since the development of the railways. In fact, the railways have always looked upon canals as their great enemies, have bought them up and destroyed them where possible, and have otherwise by competition of rates and other methods endeavoured to kill them wherever possible. There are, therefore, a great number of derelict canals, particularly in the South of England. The Basingstoke Canal is almost in that condition. The old canal connecting the Wey and the Arun, which starts near Guildford, is quite unnavigable, but it is surprising what a distance can be navigated even on these derelict canals with a light canoe. Some of them are the prettiest places in the world, and pass through delightful scenery. The value for pleasure purposes of the motor boat would be enormously increased by rendering these canals navigable. The expense would not be great. Many of them are all right, with the exception of the lock gates and the need of dredging and cleaning. As the motor boat industry grows, perhaps someone will approach Parliament on the subject. The railway companies will not like the resurrection of the canals, but a *modus vivendi* might be reached in the first instance by explaining that the movement is only directed to facilitate the operations of pleasure boats.

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The Life of Negative Battery Plates.

HERR SCHOOP, with whom our electromobile friends are doubtless acquainted as a pre-eminent authority and writer on accumulator batteries, has been collecting some data which, if reliable, are rather at variance with the general experience obtained with electromobiles in this country. In the case of ordinary station batteries subjected to heavy loads, such as for tramway work, he states that the positives are not usually capable of outlasting more than two sets of negatives. In automobile batteries he concludes that as there is not any reason to give the negative a much greater capacity than the positives, the life of positive and negative plates in such batteries is about equal. He attributes the shorter life of the negative to the stronger acid used, owing to the desire to economise space. Herr Schoop does not give statistics justifying these views, and we think that his conclusion is arrived at mainly *à priori*. However thin the negatives are made, even for automobile purposes, they still have a much greater capacity than the positives, and we think the majority of electromobilists in this country will bear us out when we say that in practice in all electromobile batteries the negatives will last out two sets of positives.

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Distinctly Unpleasant.

WE cull the following flower of thought and expression from what purports to be a critical appreciation of the exhibits at the recent Paris Salon :—

> . . . they have lubricators enough to fill a store, and most of them are using, in addition, one with wheels going round to please Toddy, and big enough for a decently behaved and not too thirsty engine of five times the size ; gear-boxes have grown in size and number of wheels, and operating spindles and forks, and one has not enough parts inside, so, like a Dutch clock, with its guts hanging down the wall, this has a pair of entrail-looking slotted links, and radius-rods and connections hanging out in the dust.

Technical descriptions of exhibitions, whether critical or merely "laudatory," have sometimes been accused of dryness, but we have not before come across an instance of their being made absolutely repulsive. Such phraseology in the pages of any ordinary commercial periodical would, we think, give occasion for remark and justifiable protest on the part of its readers. To introduce ultra-Zolaesque unpleasantness into what purports to be a technical description is a new departure in writing—we cannot say literature. On the prejudiced unfairness of the observations, comment is superfluous—and needless. Only a paper which for the time being is the organ of a powerful club, and is sent to members whether they wish to receive it or not, could venture to foist this sort of thing upon its readers—far less preface it with an editorial "puff adulatory," commending it as an example of what a critical technical article ought to be.

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And Hardly Creditable to the Club.

NOT only opponents of the automobile movement, but the very large number of automobilists who are out of sympathy with the policy of the Automobile Club and its newspaper, will be likely to smile smiles at the further suggestion put forward in the said "puff adulatory"—that the judges in the recent Reliability Trial are particularly qualified—in fact, the only persons qualified—to adequately describe the exhibits at the Paris Salon. We are also permitted to infer that before those Trials were held they were not qualified to report on such a subject, as we are editorially informed that "The experience and knowledge gained by them in the recent Trials qualified them above all others to judge the cars and accessories that were to be seen in Paris." The judges worked very hard at the Trials, as we all know, and deserved well of the automobile community, though many of them who did the hardest work have not been amongst the small number who have specially laid themselves out for taking credit in the matter, but there is no object in making an estimable body of gentlemen look distinctly foolish by ill-judged adulation of this kind.

To consider the matter seriously, there is no doubt whatever of the capabilities of the judges as a body, or of the efficient manner in which they performed their duties and formulated their report. But the publication of ill-advised articles such as the one from which we have quoted, and equally ill-advised editorial introductory puffs about them in the Club *Journal*, are certainly calculated to undermine the confidence of manufacturers who have spent considerable sums of money and made enormous sacrifices of time and energy to take part in the trials, and of such others as rely upon the Club *Journal* for what they assume to be facts. We and others are constantly having to complain of the indiscretions, want of judgment, and occasional want of taste for which the Club *Journal* has established an unenviable reputation. In the interests of the Club and the industry it is more than time that this sort of thing were stopped.

The present *bêtise* is scarcely less serious than previous similar errors of taste and judgment, for, apart from all other considerations, it suggests that the Club and its paper are being converted into a "mutual admiration society," in which the main function of the journal is to glorify the exploits of a small clique without particularly caring what apple-carts may be upset in the process.

THE HOTCHKISS 20-H.P. PETROL CAR.

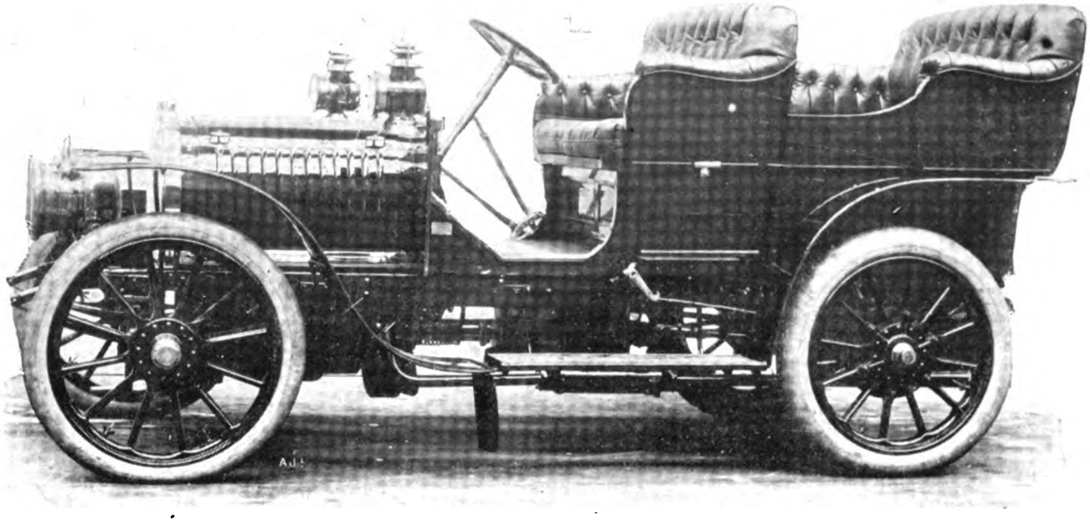


FIG. 1.—The Hotchkiss Petrol Car.

THE exhibit of the well-known ordnance firm of Hotchkiss and Co. in the recent Salon in Paris attracted a considerable amount of interest, both because the firm has only recently taken up the manufacture of complete automobiles, and because the chassis shown was such an excellent example of first-class workmanship and finish. The Hotchkiss car, one of which is shown in Fig. 1, follows more or less on the usual live-axle lines of construction. Nickel steel is very largely used in its construction, this alloy being employed for the frame, the shafts, the gear-wheels, and the axles. The driving mechanism is fixed at a somewhat lower level relatively to the frame than is usual, and the engine and the gear-box are both attached direct to the side members of the frame. Ball bearings are used throughout, not only for the gear-box, the live-axle, and the wheels, but also for the crank-shaft of the engine itself—a somewhat novel departure in an engine of this size, and one which will be watched attentively by engineers.

Other unusual features of the Hotchkiss chassis, and two by which these vehicles can be easily recognised at a glance, are well shown in Fig. 2, and in our other illustrations. The front wheels are so fitted to the tubular axle that the pivots about which they turn are placed right inside the hubs, so that the wheels turn about their point of contact with the road. The construction adopted gives considerable strength and provides large flat guide surfaces above and beneath the axle end close up to the wheel. The other characteristic to which we refer is the special shape and form of the honeycomb radiator which is used, this being practically cylindrical, and having triangular shaped holes for the air to pass through.

The main frame has tapering side members and substantial cross members, the arrangement of which is seen in the plan, Fig. 3, and in the views of portions of the chassis shown in Figs. 4, 5, and 6. The frame is narrower in front of the dash than behind it, and is carried by a transverse spring at the rear, in addition to the four semi-elliptic side springs; this transverse spring is fixed centrally to the frame, and its downward curving ends are shackled to the rear ends of the side springs, which are outside instead of beneath the frame. The live-rear-axle is tied to the frame by radius rods passing from it to each side of the frame.

The engine is fixed to the frame by four feet projecting upwards from the lower portion of the crank-chamber, and the crank-shaft is mounted with no less than five ball bearings in this casting; a bearing is fitted between each of the crank-pins. The engine has its four cylinders cast in pairs, with their mechanical inlet valves arranged on the

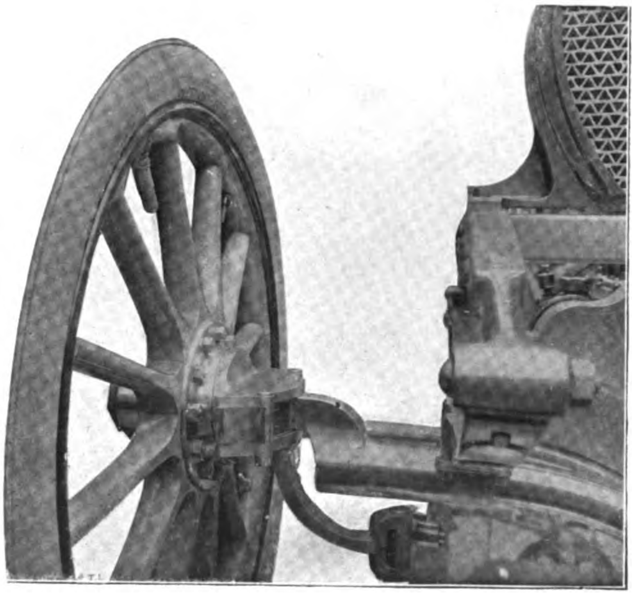


FIG. 2.—View showing the special forms of Steering Head and o Honeycomb Radiator employed on the Hotchkiss Car.

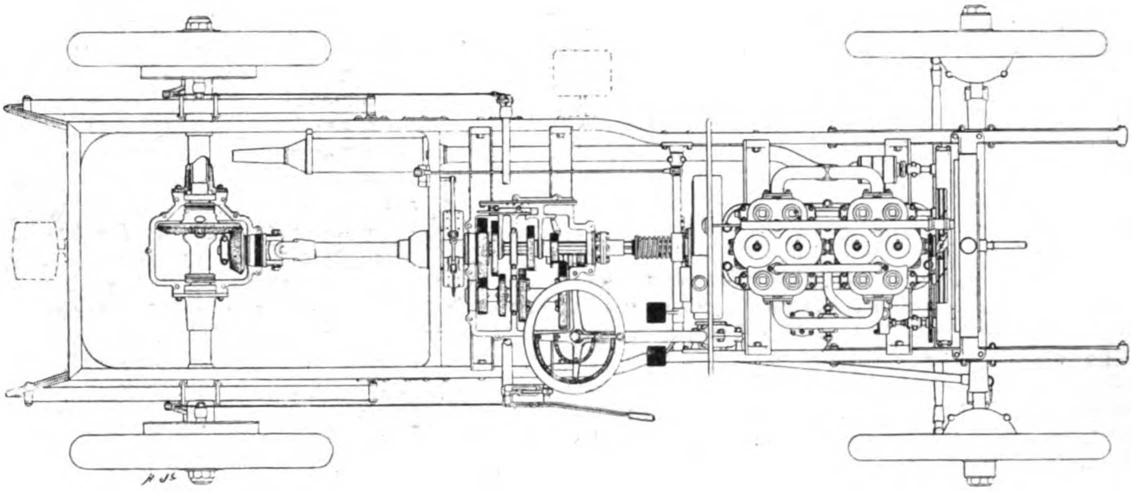


FIG. 3.—Plan of the Hotchkiss Chassis, showing General Arrangement of the Mechanism.

opposite side to the exhaust valves. Low-tension igniters constitute the inspection plugs above the inlet valves, and the gear-driven magneto is fixed to the crank chamber on the left. A circulating pump, of the gear-wheel type, is placed in a corresponding position on the other side, and is also driven through spur gearing; it circulates the water direct through the jackets and the radiator, and the radiator is cooled by a belt-driven fan having adjustable blades. An automatic carburettor is employed, in which the size of the spray jet is varied simultaneously with variations of the volume of the combustible charge drawn into the cylinders.

A clutch of much the usual cone-type is employed, and the pedal by which it is operated is fitted so as to be pushed forward instead of downward by the driver's foot. The power is transmitted from it to the change-speed-gear by a comparatively long and flexibly-jointed shaft. The gear itself provides for four forward speeds and a "reverse," with a direct through-drive on the top speed. It is of the Mercedes pattern, in which two separate sliding-sleeves are arranged in the gear-box for introducing the different gears. The lay-shaft lies to the right of the through shaft, and both of them have three ball-bearings to support them; as already said, the gear-wheels are made of nickel steel. A metal-to-metal brake is fitted to the longitudinal-shaft close behind the gear-box, and the propeller-shaft, which transmits the power to the live-axle, has universal joints of the usual kind.

The stationary casing surrounding the differential gear on the live-axle is divided with a horizontal joint, instead of a vertical joint as is more usual; the upper portion can therefore be taken off for examining the gear. The casing is fitted with ball bearings, both in front and

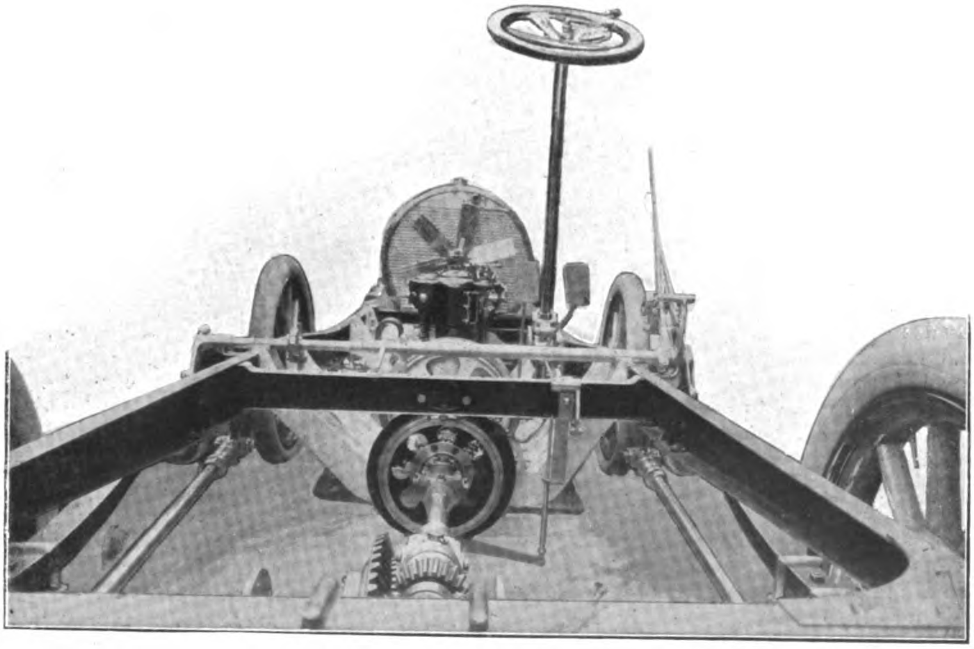


FIG. 4.—A View from Above and Behind, showing a Portion of the Hotchkiss Chassis. The Covers to the Gear-Box and the Casing around the Differential Gear have been Removed.

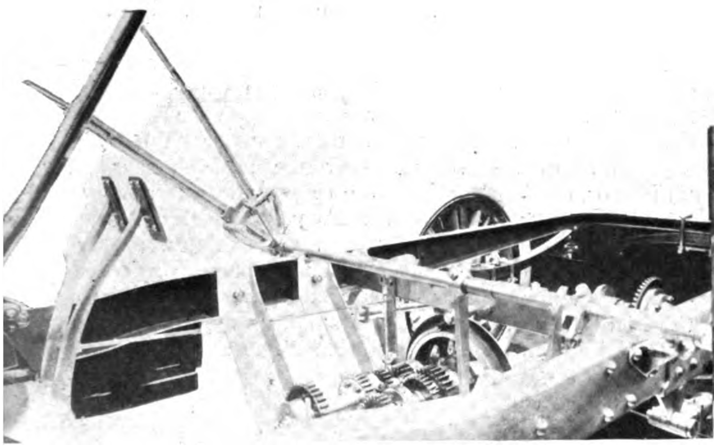


FIG. 5.—Showing the Rear Portion from the Left. The Covers have been Removed, as in Fig. 4.

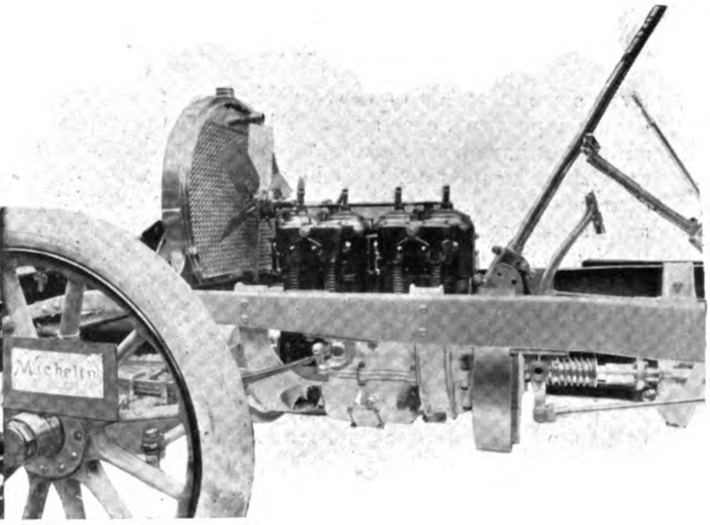


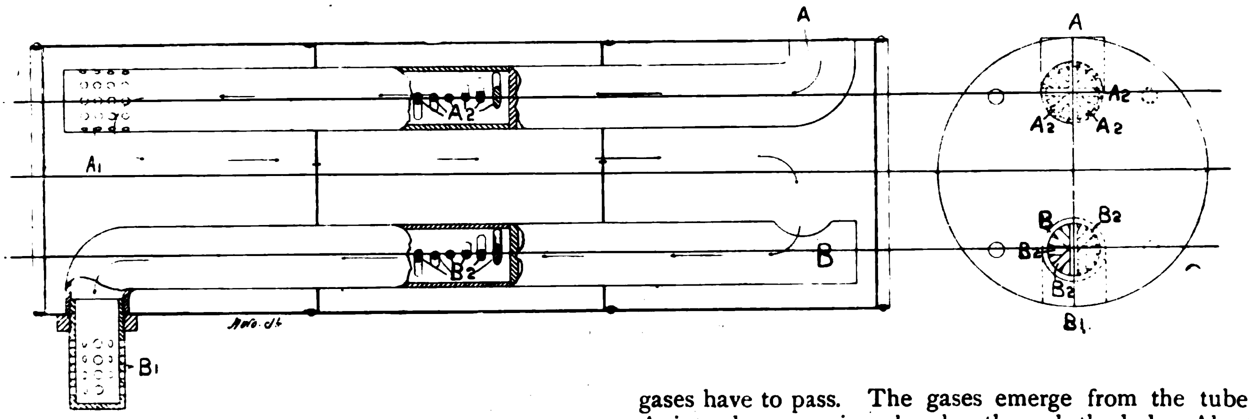
FIG. 6.—Showing the Engine in Place in Front, from the Left.

Other Views, showing Portions of the Hotchkiss Chassis.

behind the small bevel wheels driving the differential, and both bevels are of very substantial construction.

The Hotchkiss is, in other respects, similar to the majority of vehicles of the live-axle type now on the market, and has the usual side levers, foot pedals, and small controlling levers above the steering wheel. The rear brakes are of the internal expanding pattern, and the car has a long wheel base. The Hotchkiss Company, as already reported in our columns, are manufacturing and entering three racing vehicles for the French eliminating trials in connection with this year's Gordon-Bennett Race.

THE "STANLEY" EXHAUST BOX.



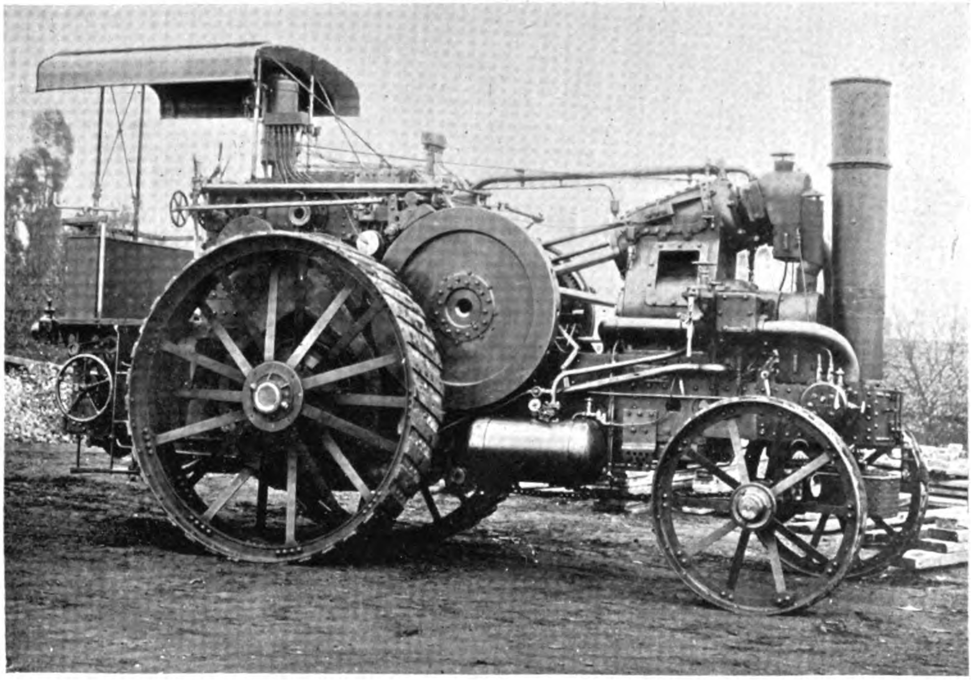
The exhaust box shown in the accompanying illustration is specially designed for use on petrol cars, and is constructed in a somewhat novel manner. The underlying principle upon which it is based is that of breaking up the exhaust gases, and retarding them, by allowing them to pass through tubes across which a large number of pins are fixed diametrically, so as to form a kind of Archimedean screw inside it. In the box shown, two of these tubes, A and B, are fitted in a large expansion chamber, the gases from the engine passing into the box through the tube, A, and ultimately finding their way out to atmosphere through the tube, B. Both tubes are studded with diagonal pins, A^2 and B^2 respectively, which form two spiral passages through which the gases have to pass. The gases emerge from the tube, A, into the expansion chamber through the holes, A^1, at the extreme end, and are subsequently allowed to flow out through the perforated cap, B^1, after they have found their way through the entire length of the tube, B.

We have had an opportunity of judging its effectiveness under working conditions on a car, and the box thus constructed appears to be extremely effective. It is the invention of Mr. Stanley W. Andrews, and is being manufactured, under license from him, by the Motor Traction Company, who are making it in various sizes, both to suit all types of cars and for stationary engines. On the authority of Messrs. Panhard and Levassor, who have tested one of these silencers, we have it that the back pressure is so slight as to be difficult to measure.

A TRIUMPH FOR HEAVY OIL.

EVER since the trials of heavy vehicles of the traction engine type two years ago at Aldershot, the military authorities have been looking for a tractor that would do what a steam tractor could accomplish without its demands on fuel, and without requiring to be constantly replenished with water. Accordingly, early last year, the Secretary for War offered three prizes of £1,000, £750, and £500 for the three best tractors fulfilling certain conditions. The conditions were very stringent. In the first place the total weight of the tractor ready for the road, with all its fuel and water on board, was not to exceed 13 tons, and of course it must be quite independent of any extraneous aid. It should be capable of hauling a load of 25 tons at an average speed of three miles an hour for 40 miles without taking in fuel or water. In this 40 miles it should go up gradients of 1 in 18, load and all, and should use oil fuel of not less than 75° flash point. The tractor should also be capable of doing spurts of 8 miles an hour on the flat, with half its normal load, viz., 12½ tons, and should be equal to climbing hills of 1 in 6 with this reduced load, and going through 2 feet of water. Winding gear was also requisite, and the tractor was to carry 75 yards of flexible steel rope capable of withstanding a strain of 15 tons. Further conditions were added with regard to steam engines, but as no steam tractors turned up these are of academic interest only. The competition was open to all comers. Even Americans and Germans would have been admitted, and some of them talked big of the great things they were going to do. But when the day of the trials arrived in November only one competitor rumbled up to the starting post, and that was the heavy oil tractor of the well-known firm of Messrs. Hornsby and Sons, of Grantham, whose stationary heavy oil engines have acquired such world-wide celebrity.

Messrs. Hornsby and Sons had a single-cylinder heavy oil traction engine on the road many years ago, and we have referred to it on one or two occasions in the columns of the Journal, but their present great success will probably wipe out all memory of that experiment; for the successful tractor, of which we are able to provide our readers with two illustrations, is a remarkable machine from every point of view. In the first place, it not only obtained the first prize of £1,000—though it was the only competitor, and though it would have been open to the War Office to bestow any smaller amount—but it obtained a bonus of £180 as well. The significance of this bonus ought to be widely understood. Nobody anticipated that a tractor would be able to run more than 40 miles with full load without taking in water or fuel. In case, however, any competitor should succeed in doing so, it was arranged that a bonus should be paid of £10 per mile accomplished in this way above the 40 miles. As the Hornsby tractor accomplished 58 miles without taking in fuel or water, it received a bonus of £180. The trials took place at Aldershot over practically the same ground as the heavy vehicle trials of two years ago, and included the sandy waste of the Long Valley. After the trials were concluded the tractor was opened and examined in detail, and no traces of wear were observable. This is the more significant as the tractor before starting for Aldershot had been practised about the Lincolnshire wolds for a distance of 200 miles, and ran to Aldershot by road on its own power, a distance of 150 miles, while the ground covered during the trials was 500 miles.



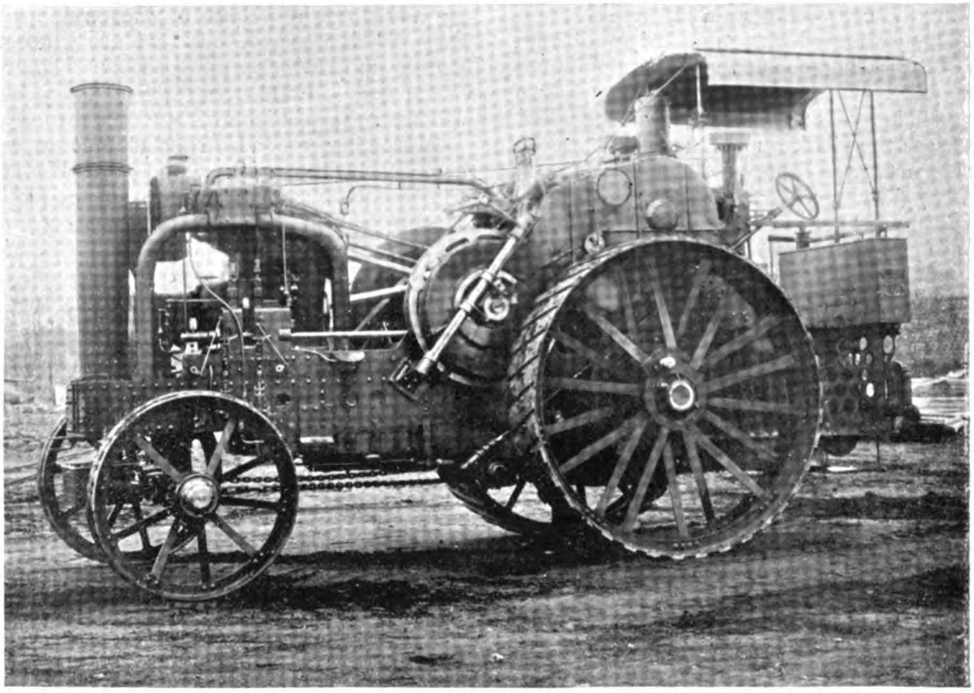
The Hornsby Heavy Oil Military Tractor.

Most people are familiar with the general arrangements of the Hornsby-Akroyd engine, so widely used for electric lighting and other power purposes, so that the ingenuity displayed in adapting this type of engine to the propulsion of a powerful tractor cannot fail to excite general interest. The engine is mounted on what we may call an ordinary traction engine frame, that is a frame with ordinary traction engine rear driving wheels of 7 feet diameter by 18 inches wide, the front wheels being 42 inches diameter by 8 inches wide.

The engine itself consists of two Hornsby-Akroyd cylinders mounted at an angle to one another on the same vertical plane, and driving by connecting rods on to a common crank, the crank-shaft being provided with a flywheel of the steel disc pattern, 4 feet 3 inches in diameter, and with a rim of 4 inches square cross section, the normal speed of the engine is 350 revolutions per minute. The motion is transmitted to the driving wheels through a change-speed-gear of the sliding spur-wheel type which provides for four speeds forward and a reverse, the forward speeds being 1½, 3, 5, and 8 miles per hour.

The lower of the two engine cylinders is horizontal, and the upper is inclined downwards at a moderate angle. They are of the well-known Hornsby type, having a vaporiser, which also serves as ignition device, forming a continuation of each cylinder and connected therewith through an aperture in the back end by a water-jacketed neck. The dimensions of the working cylinders are 13 ins. diameter, and 18 ins. stroke. Each working cylinder is provided with an air inlet-valve and exhaust-valve, both mechanically actuated from cams on a half speed shaft driven by skew-gearing from the crank-shaft. The oil, of which 100 gallons is carried in a reservoir, is pumped up by a pump and delivered in a fine jet into each vaporiser ignition-chamber during the intake strokes of the engine when air is being drawn into the working cylinders. The oil is vaporised, or more correctly speaking, gasified, in the vaporiser, and on the compression stroke the air in the cylinder is forced through the water-jacketed neck into the gas filling the hot vaporiser, mixes with it, and causes an explosion. The governor, which is of the ordinary centrifugal type, acts on a modified hit-and-miss principle, that is to say, when the normal speed to which it is set is exceeded, it opens a by-pass valve on the pump delivery and allows the oil to return to the reservoir instead of being squirted into the vaporiser. It can be cut out by a lever on the foot-plate to run the engine at starting or for spurts.

The operation of the engine pre-supposes that the vaporising chambers are hot. Therefore for starting they have to be heated by external means, these external means consisting of a lamp under each vaporiser on the Bunsen principle in which the oil is warmed by passing through a coiled tube, and forced draught is provided at the commencement. When the vaporisers have been sufficiently heated by the lamps, the engine is started by the admission of compressed air or gas to the lower cylinder, the engine having been previously brought into a position in which the piston of that cylinder is just over the dead centre, prior to its working stroke. The compressed gas is stored in a welded steel receiver on the right-hand side of the engine, and is admitted by opening a valve by a lever on the foot-plate. The passage between the welded steel receiver and the engine cylinder is also provided with a check valve, so that if the lever is depressed too long the explosion is prevented from striking back into the receiver. After the engine is started the lamps may be extinguished, as the explosions suffice to keep the vaporisers hot. The supply of explosive mixture in the steel cylinder for starting the engine is kept up by a connection between the engine cylinder and the steel receiver, through a valve loaded to a certain pressure, so



The Hornsby Heavy Oil Military Tractor.

that when that pressure is not attained in the receiver a portion of the gases from the cylinder passes through the valve into it. A small hand-charging pump with flywheel is provided to enable the pressure in the receiver to be kept up if the engine fails to maintain it.

The stroke of the pump which delivers the oil to the vaporiser can be varied by a hand-lever and quadrant mounted on the foot-plate, so as to correspond with the load on the engine.

The exhaust from both cylinders passes to an exhaust-box situated in the rear of the chimney visible in the illustration, and from this exhaust-box it proceeds up a pipe to the top of a vertical cylinder arranged inside that chimney, down which it has to pass, and up again between the cylinder and the chimney walls before escaping to the atmosphere. The noise occasioned by the air inlet-valves is muffled by surrounding the tubes leading to them with a box perforated at one end.

The water-cooling arrangements are very effective, the water after leaving the cylinders passing to a brass-tube Clarkson radiator, surrounded with the usual spiral wire, the ends of the tubes being connected to an aluminium header, and a vertical expansion tube being added to allow for the expansion of the water when it gets hot. Air is drawn through the Clarkson radiator by a sirocco fan mounted underneath the foot-plate, and driven from a cross-shaft actuated by bevel-gearing from the crank-shaft. The vertical expansion pipe is fitted with a condensing coil to reduce the evaporation to a minimum, and the arrangements are so effective that in running 30 miles only a gallon of water is consumed. The cooler and fan, being arranged underneath the vehicle, are protected by flanged steel plates of such strength that should the tractor sink in sandy soil they are sufficient to take the weight of the whole vehicle and prevent injury to these structures.

The lubrication is carefully thought out, and separate tubes are taken from the oil reservoir, which is mounted high up in front of the driver, to every bearing and important point. How effective the lubrication is was evidenced by the splendid condition of the bearings and other parts when examined after the conclusion of the trial.

The fuel ordinarily used by the tractor is refined Russoline, which usually has a specific gravity of about ·825. But it is said that similar American, Scotch, and Burma oil, and Texas liquid fuel can be employed by altering the adjustable compression plates, or varying the compression by an adjustment provided at the rear end of the connecting rods. Even Astatki, it is said, can be employed, though on this point we are a little sceptical. In any case the output of the engine with these crude fuels is diminished, and we are informed that the vaporisers require cleaning out every twelve hours when crude fuel is employed. The average consumption of oil is 1·2 lbs. per mile with maximum load.

Altogether the Hornsby Company are to be congratulated not only on winning the War Office first prize with bonus, but on having so successfully applied their special type of heavy oil motor to heavy traction purposes. No doubt they will reap the reward of their patience and skill in a large and lucrative demand for tractors of this type.

THE ENGLISH DURYEA PETROL CARS.

WE have already given (November 28th) a brief general description of the new British Duryea model, which is being built in Coventry, and some parts of it, including the engine, by Messrs. Willans and Robinson, of Rugby; a chassis was on view at the last National Cycle and Motor Show. The design is unusual—not to say unique—in many radical respects, and we therefore give a plan and side elevation which show the form of construction adopted. The ash-filled channel steel frame, A, is mounted above the live-rear-axle on somewhat curiously shaped side-springs, the rear ends of which are carried by the projecting horns, A^1. The two transverse members, A^2 and A^3, are fixed to the side members of the frame, and are so shaped that they pass down and beneath the engine, supporting the crank-chamber, C^1, and the cylinders, C^3, respectively. All four corners of the frame, A, are stiffened with angle plates, and the front of the frame is attached to the front axle by the specially shaped leaf springs, A^4, which are bolted to the frame, and hinged to the axle on its under side. The front axle is also tied to the frame by the diagonal rods, A^5, which are rigid with each end of the axle, and are attached by universal joints to the cross-member, A^2. The upper framework, A^6, built of angle steel, is fixed above the engine; it serves to carry the hand levers, D^1 and D^2, the steering tiller, B, and the driver's seat. The front wheels are 30 ins. in diameter and the rear wheels 36 ins.

The steering piller, B, is also held at its lower end by the bearing formed for it in the cross-member, A^2. It has a hinged tiller at its upper end, and is rigid with a pair of lever arms, B^1, at its lower end. The arms, B^1, are connected by diagonal and crossing rods, B^2, with the steering heads of both wheels, and these steering heads are also tied together by the usual transverse rod, B^3, just behind the axle. By this arrangement the tiller acts with equal directness on each of the front wheels and the rods, B^2, are only called upon to act in tension. The steering heads themselves are mounted at an angle so that the axis of the pins, about which the stub axles are turned, intersects the contact point of the tyre with the rod; inequalities of road surface, or small obstacles, have, therefore, but little tendency to deflect the direction of travel. The tiller can be turned over about its hinge, so that the car can be steered by either occupant.

The three cylinders, C, are cast in one piece, and are mounted at a slight angle from the horizontal, so that the oil in them tends to run back into the crank-chamber. The cylinders have a bore of 4½ ins., and the stroke of the pistons is 4½ ins. The engine runs at a normal speed of 600 revs. per min., and develops about 12 h.p. The inlet and exhaust valves are fitted at right angles in the cylinder ends, so that either of them can be removed without disturbing the induction—or the exhaust—pipes. The valves are held on their seats by a special form of grasshopper spring, instead of by helical springs, and are operated through horizontal push-rods above the cylinders, and pivoted levers behind them, from a cam-shaft enclosed in the top of the crank-chamber. The cranks are set at an angle of 120 degrees to one another, and the shaft is mounted on a lower level than the axis of the cylinders, as in some stationary gas engines. The carburettor, C^2, is of the float-feed type, and has an adjustable needle-valve arranged above the jet to control the size of the orifice; a throttle valve is fitted, and the main air supply is also variable. The engine is not governed automatically. The induction pipe passes

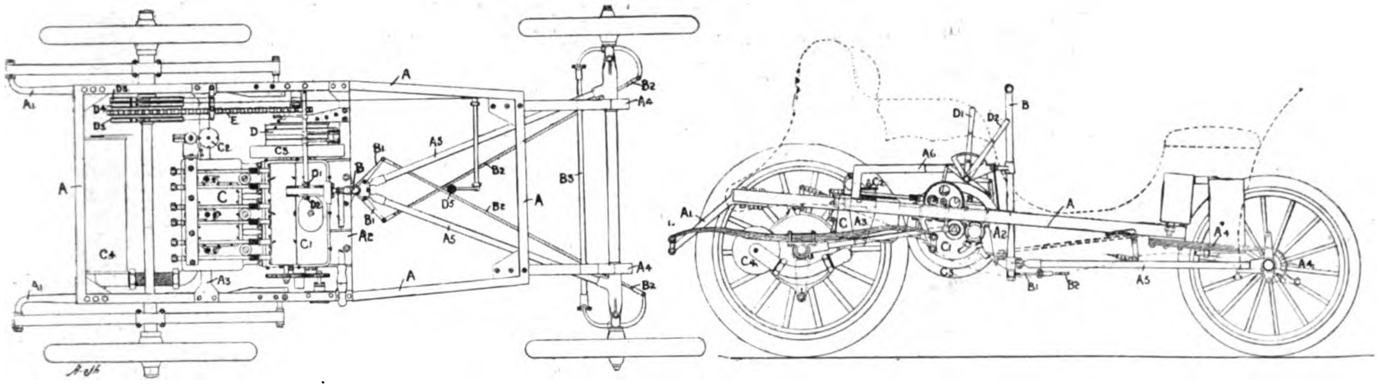


FIG. 1.—Plan. | FIG. 2.—Side Elevation.

The 12-h.p. British-built Duryea Petrol Chassis.

across above the cylinders, and the exhaust pipe, communicating with the exhaust box, C^4, is beneath them. The cylinders are water-jacketed, and the circulating pump, which is fixed to the main frame on the right, is gear-driven. High-tension ignition plugs are fitted vertically into the cylinders, and these are used in connection with a Dawson high-tension magneto apparatus. The power of the engine is controlled by twisting the handle on the tiller, and the time of ignition is automatically controlled by a governor on the magneto.

The flywheel, C^3, is fixed just outside the crank-chamber on the left, and the change-speed-gear, D, which is of the epicyclic type, and has a main clutch combined with it, is fitted close up to the flywheel, while the sprocket, from which the power is taken by the chain, E, to the live-axle, is just outside it. The gearing gives a low speed and a reverse, but, for the top-speed, revolves as one solid piece with the crank-shaft; the left-hand end of the crank-shaft receives the starting handle. Only one set of planets are used in the gear. The high-speed clutch, which has a very large friction surface, is of the adjustable toggle type, with expanding members. The hill-climbing gear gives a speed reduction in the ratio of about 3 to 1, and the reverse gear a reduction of 2 to 1.

The live-axle is constructed with one shaft which runs right through from hub to hub, and is fixed to the off-side driving-wheel. The near-side wheel is attached to a sleeve which runs upon this shaft, the differential gear being introduced between the sleeve and the shaft. The differential has three planet bevel-wheels, and the large chain wheel, which is fixed to its shell, is formed with a brake-drum, upon which the band, D^4, can be caused to press by the foot pedal, D^5. Other brake-drums are also secured to each of the concentric bevel-wheels of the differential. The bands, D^3, which act upon these drums, are connected together through a simple compensating device, and are operated by hand. The change-speed-gear and the compensated brakes are operated by the two levers, D^1 and D^2, placed in the centre of the seat; the lever, D^1, introduces the reverse, if moved in one direction, and the brakes, if moved in the other; the lever, D^2, brings the high or the low, forward, speed into play, according to the direction in which it is moved. Both levers are normally vertical.

THE DEUTSCH AIRSHIP.

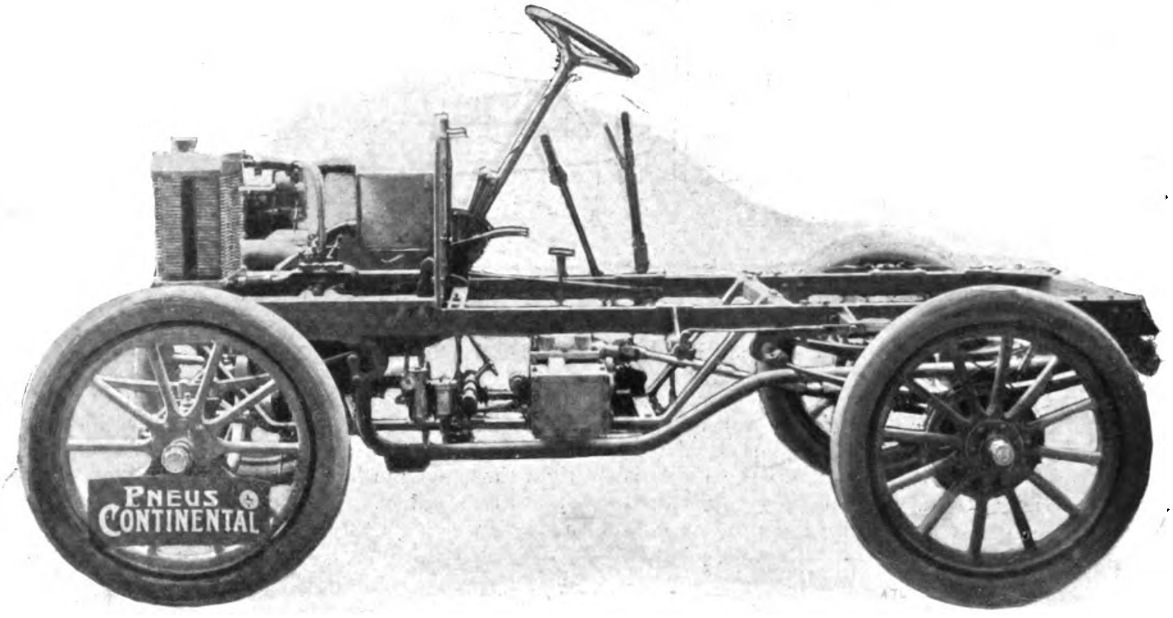
As most of our readers interested in aeronautics are aware, M. Henri Deutsch, the originator of the prize won by M. Santos Dumont, has been building a large airship of the navigable balloon type for some considerable time past. The airship is now so far advanced that it has been taken out of its shed, fully inflated, allowed to rise a short distance in the air, and its motor and propeller have been tested. On the 31st ult. it was inspected by the Prince of Monaco, who expressed himself greatly interested and pleased with its design.

The Deutsch airship, which has been designed by M. Tatin, is of what we may call the Santos Dumont type. The gas vessel, which has a capacity of 2,000 cubic meters, was constructed by M Mallet. The gas vessel is equally pointed at both ends, exactly like some cigars; its length is 58 metres and diameter 8·2 metres. It consists of a double envelope, of which the interior envelope is of French silk designed to resist the pressure; and this is enclosed by an envelope of fine varnished Japanese silk impermeable to the gas. The French silk is capable of withstanding a strain of 800 to 900 kilogs. per square metre. The weight of the Japanese silk envelope is 135 grammes per square metre, and that of the French silk 215 grammes per square metre, the total weight of the material of the gas vessel being 350 kilogs. As in the Santos Dumont balloons, the tautness of the gas vessel is ensured by the employment of a ballonette, which is of rather small proportions, being a complete sphere when fully inflated of the same diameter as the gas vessel itself. It is situated a little in front of the centre of the latter.

The hull of the airship, which is 30·4 metres in length and weighs 200 kilogs. is also of the Santos Dumont type; the members of the frame are of wood, and the struts and ties cross each other so that the whole may be said to form a double lattice-girder of wood. The hull is suspended from eye-bolts in flaps, forming part of the material of the envelope by steel wires 2 mm. thick, and hangs 7 metres below it. At the rear of the hull, near the propeller, lateral projections, or antennæ, are attached to the gas vessel by bifurcated wires, counteracting the torsional effect of the propeller.

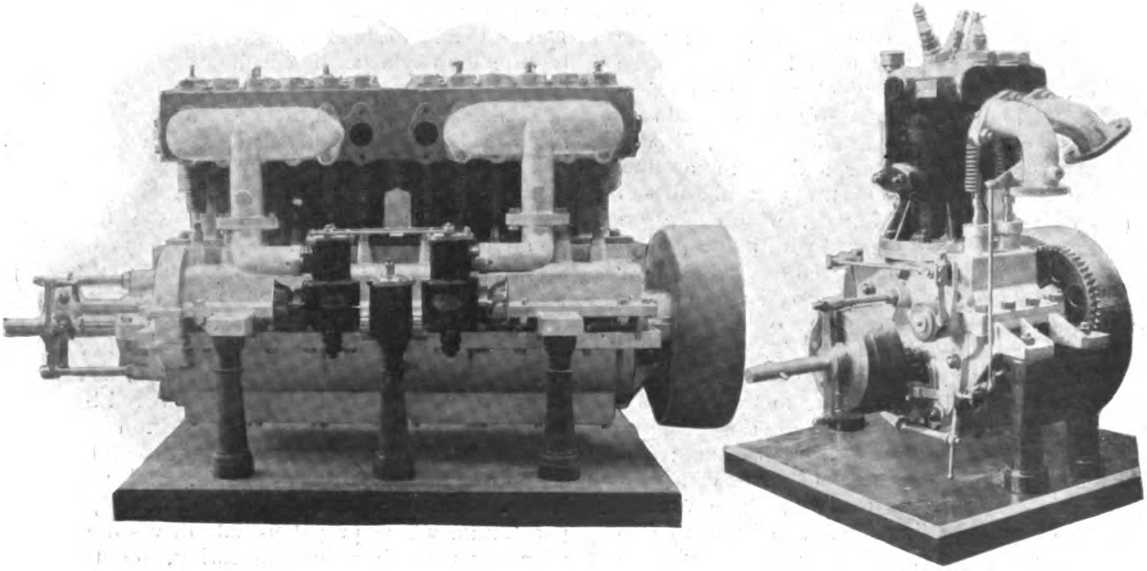
The motive power is provided by a petrol motor, with four cylinders developing 63-h.p., and weighing 450 kilogs., which revolves a propeller-shaft at 930 revolutions per minute. The propeller-shaft drives the two-bladed propeller through reduction-gearing, and the propeller has a diameter of 7 metres with a pitch of 6 metres. It is calculated that the Deutsch airship will be able to take up three passengers.

THE 1903 PARIS SALON.

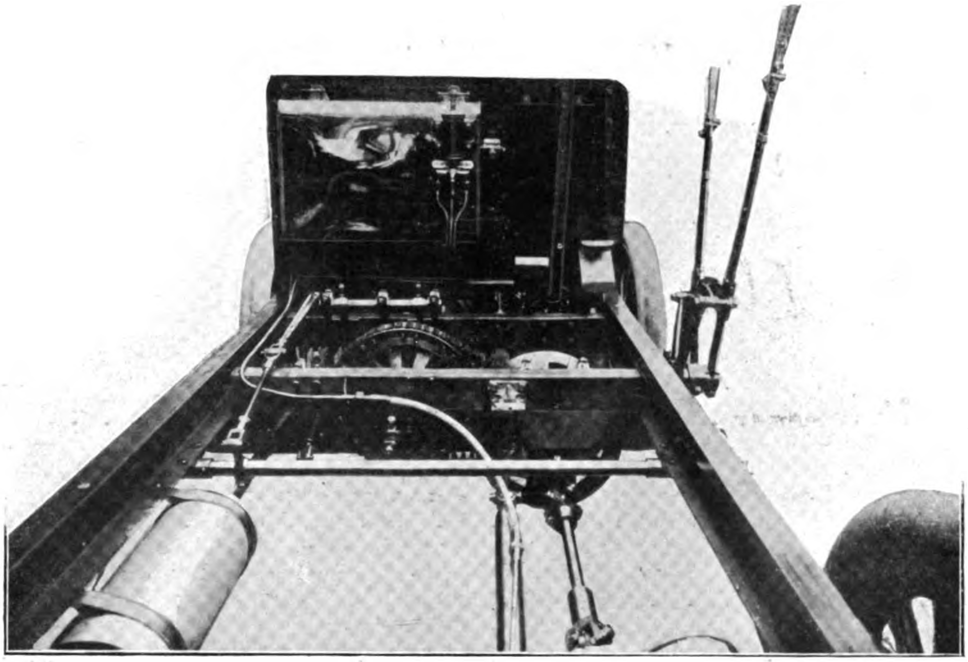


PARIS SALON.—The Louet Populaire Chassis, in which the special change-speed-gear is placed transversely, and the power transmitted by a propeller-shaft from it to the live axle.

Mons. E. Louet, whose special form of change-speed-gear was described by us in connection with the 1902 Paris Salon, had two differently constructed chassis on view on his stand and in both of which his special form of change-gear is employed. One of these was fitted with a single-cylinder engine and the other with an 18-h.p. 3-cylinder engine; in the former, a very low underframe supports the engine and the gear, and the latter lies transversely across the frame, with the main-clutch between it and the engine. The power is transmitted from the upper shaft of the gear-box through a propeller-shaft having universal joints to a live axle. The larger chassis has its change-speed-gear placed longitudinally on the right side, and the power is transmitted from a differential countershaft by side-chains. The steering gear on the car is unusually large and has the appearance of being unnecessarily so. In both engines—as also in a 6-cylinder engine on the stall—double-pole ignition plugs are fitted into the heads of each cylinder in addition to single-pole plugs lying above the mechanical inlet-valves. These two plugs are connected in series with one another, the one acting as a spark-gap for the other. The large engine and one of the single-cylinder type are shown in the accompanying illustrations, where it will be noticed that all the valves are arranged on the same side of the cylinders, and that a double carburettor is employed on the 6-cylinder model; an illustration of the single-cylinder chassis is also given. The



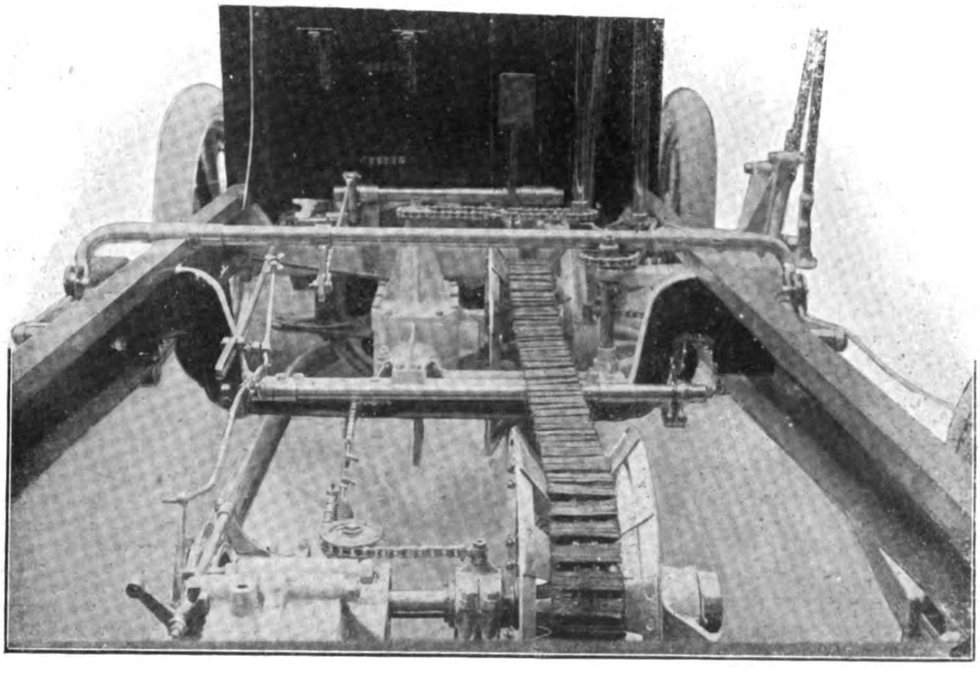
PARIS SALON.—A 6-cylinder, and a single cylinder Louet Engine, in which the mechanical inlet and exhaust-valves lie alongside one another, and double-pole ignition plugs are fitted into the cylinder heads, in addition to the single-pole plugs above the inlet-valves.



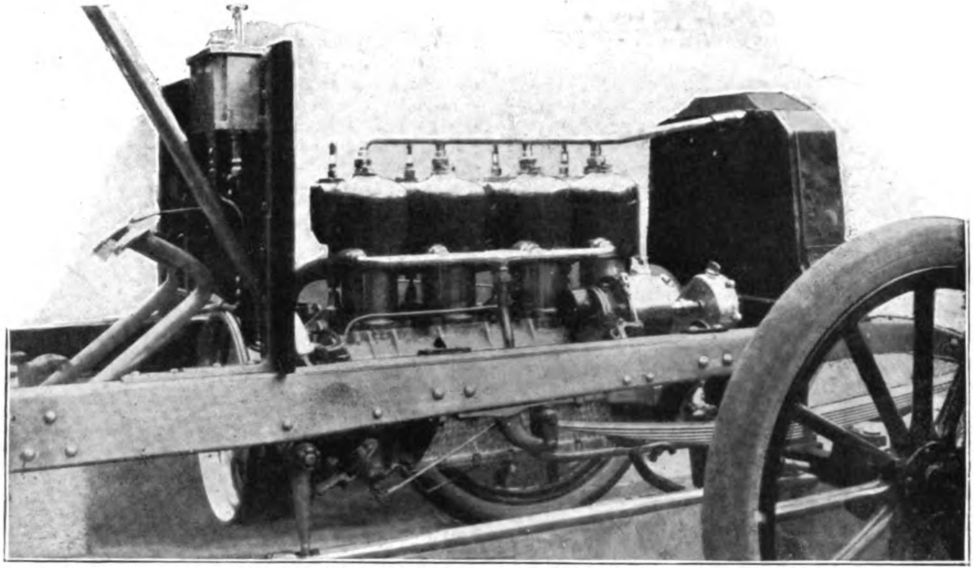
PARIS SALON.—Smaller type of Fouillaron Chassis, in which the power is transmitted by a belt running over expanding pulleys from the crank-shaft to a propeller-shaft passing to the rear axle.

special feature of the change-speed-gear is that various alternative trains of spur-wheels, for giving the different speeds forward and the "reverse," are mounted in a cage which can be moved along inside the gear-box, so that either train of wheels can be brought between a spur-wheel on the driving shaft, and another on the driven shaft. A peculiar kind of brake is employed on the rear-hubs, the two ends of the brake band being simultaneously and equally tightened when the brake is applied. For this purpose the two ends are connected together by an endless cable passing around pulleys on the frame, one of the pulleys being free to slide, and being caused to do so by the driver.

Amongst other unusual types of vehicles, those fitted with the **Fouillaron** expanding pulley gear were again in evidence—a system which we noticed in our report of the 1902 Show. The power is transmitted by a belt, composed of V-shaped blocks strung together, from one expanding pulley to another, the pulleys being simultaneously and inversely operated. In the Populaire type, the one pulley is arranged on the continuation of the crank-shaft, and the other is fitted to a short shaft on the right, which is connected with the live-rear-axle by a universally-jointed propeller-shaft; a jointed distance rod connects the axle with the frame. In the larger chassis the belt runs longitudinally, as seen in our other illustration, the driving



PARIS SALON.—Fouillaron Chassis. In this car the usual change-speed-gear is replaced by expanding pulleys, between which the power is transmitted by a special belt.

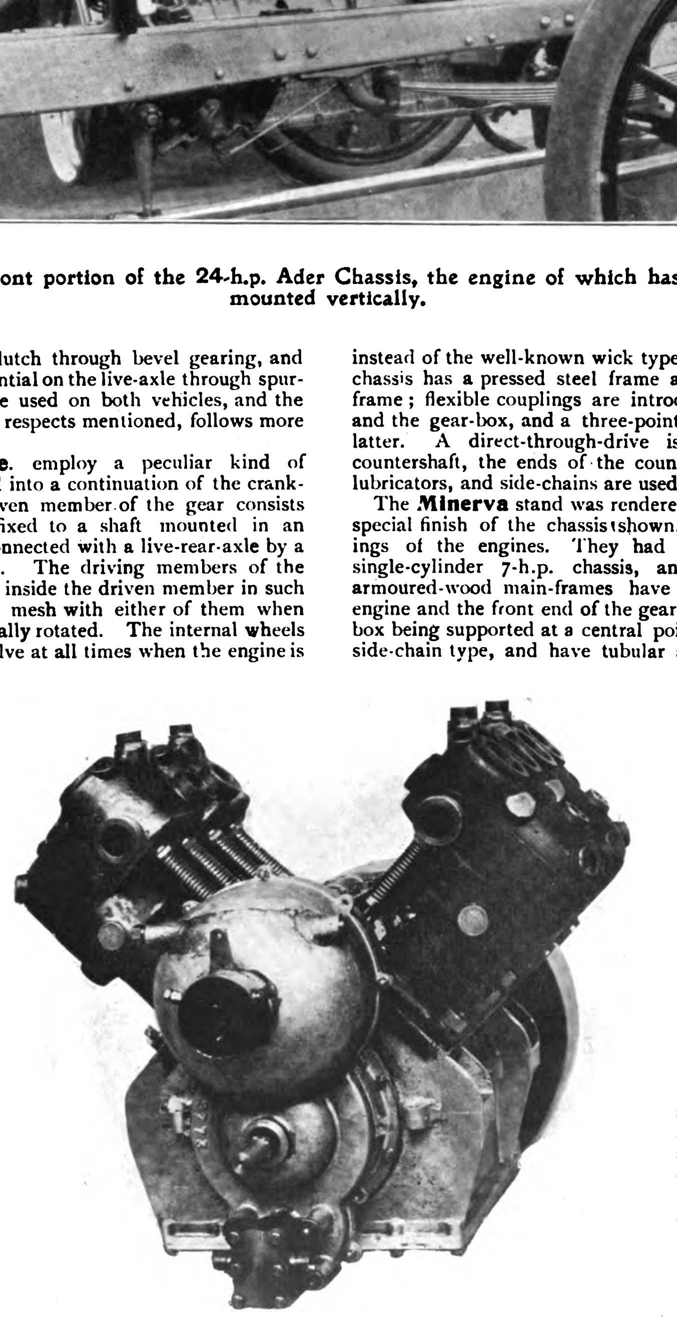


PARIS SALON.—Front portion of the 24-h.p. Ader Chassis, the engine of which has its four cylinders mounted vertically.

pulley being connected with the clutch through bevel gearing, and the second pulley driving a differential on the live-axle through spur-gearing. Pressed steel frames are used on both vehicles, and the construction, except in the radical respects mentioned, follows more or less on usual lines.

Messrs. Cohendet et Cie. employ a peculiar kind of change-speed-gear, which is fitted into a continuation of the crank-chamber of the engine. The driven member of the gear consists of an internally-toothed wheel fixed to a shaft mounted in an eccentric bearing; this shaft is connected with a live-rear-axle by a universally-jointed propeller-shaft. The driving members of the gear consist of spur-wheels placed inside the driven member in such a way that it can be brought into mesh with either of them when its eccentric bearing block is partially rotated. The internal wheels are driven by the engine, and revolve at all times when the engine is running; three forward speeds and a reverse are provided. The makers showed their invention applied to a 4-cylinder, a 2-cylinder, and a single-cylinder engine, as also a chassis of the smallest type.

The Ader Company have this year introduced 2-cylinder and 4-cylinder models (of each of which they showed a chassis) having vertical cylinders, although they still supply cars fitted with their special "balanced" engine, having inclined cylinders. In the inclined types they have now introduced mechanically-operated inlet-valves, as seen in the accompanying illustration. The vertical engines, which are of 12 and 24-h.p. respectively, have a bore and stroke of 100 and 110 mm. Each cylinder is a separate casting in which the mechanically-operated inlet-valves lie on the same side as the exhaust-valves. High tension ignition plugs are fitted into the inspection covers above the inlets and the current for them is supplied by a Basse Michel magneto. The Crouan automatic carburettor is employed, this having been adopted instead of the well-known wick type previously used. The 24-h.p. chassis has a pressed steel frame and the 12-h.p. model a tubular frame; flexible couplings are introduced between the cone-clutch and the gear-box, and a three-point suspension is adopted for the latter. A direct-through-drive is obtained to the differential countershaft, the ends of the countershaft are provided with ring lubricators, and side-chains are used for driving the rear wheels.



PARIS SALON.—A 4-cylinder V type Ader Engine, showing the arrangement of the mechanically-operated inlet-valves alongside the exhaust-valves.

The **Minerva** stand was rendered particularly attractive by the special finish of the chassis shown, particularly the cylinder castings of the engines. They had a 3-cylinder 12-h.p. chassis, a single-cylinder 7-h.p. chassis, and a 4-cylinder engine. The armoured-wood main-frames have under-frames for carrying the engine and the front end of the gear-box, the rear end of the gear-box being supported at a central point only. The cars are of the side-chain type, and have tubular axles, outside rear springs and internal cone-clutches. The lay shaft in the gear-box lies to the right of the direct-through-shaft, and there are three forward speeds and a reverse. Each cylinder is a separate casting having mechanical inlet-valves on the opposite sides to the exhaust valves. A high-tension system of ignition is employed, and the carburettor is rendered "automatic" by the interaction of two throttle-valves, the one in the induction pipe and the other in the main air supply leading to it. A ratchet and pawl device is fitted to the countershaft instead of a sprag.

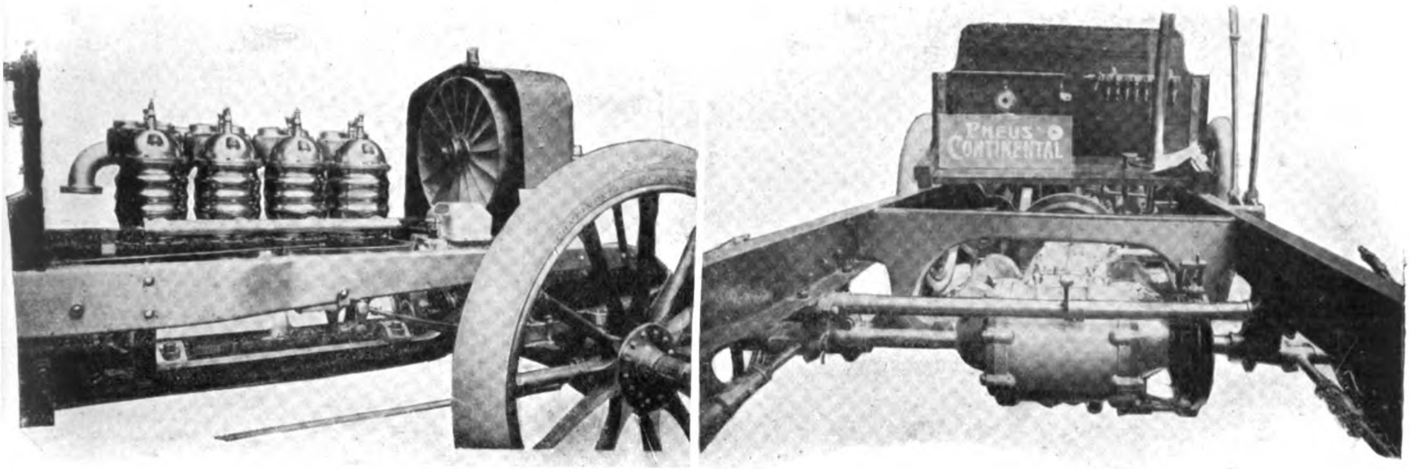
The **Vinot and Deguingand 20-h.p. Chassis** has an armoured wood frame and an angle under-frame for the engine and the gear; the side members of the frame are stayed on the underside. The four cylinders are cast in pairs. The mechanical inlet-valves lie on the one side, the exhaust valves on the other, and high-tension ignition plugs are fitted into all the valve chambers; the one set of plugs are operated by the usual electric system from a battery, and the other set is supplied with current from a high-tension magneto. Means are provided for lifting the exhaust-valves off their seats, for reducing the compression at starting. An ordinary Longuemare carburettor was fitted to the chassis we examined, but one of the automatic type is to be used on these cars. The change-speed-gear gives four speeds and a reverse, with a direct drive to the countershaft on the top speed. The sliding gear-wheels are arranged with two independently sliding sleeves, either of which can be made to engage with the change-speed-lever; the lever is for this purpose fitted with a small catch-lever at the top, which can be drawn up against it by the hand, and has the effect of connecting one or other of the sleeves with the lever according to its position. The gear-box is rigidly fixed to the main frame, and there are no flexible couplings in the countershaft. There is a metal-to-metal foot-brake on the countershaft, and very large internal expanding brakes are fitted to the hubs of the rear wheels. The company also make 10-h.p. and 14-h.p. 4-cylinder models of similar general construction.

The general construction of the **25-h.p Tony Huber** chassis is shown in the accompanying illustrations, where it will be noticed that this vehicle has a side-chain type of transmission, and that the manufacturers have adhered to their engine construction, in which copper jackets and steel cylinders are employed.

immediately behind it. No accumulators are used. The electric motor is fixed to the back axle, which is of the live type, and drives the differential through spur-gearing. Several **Mildé** cars were also on view, and in these a battery of accumulators is installed. Considerable attention has been given to the construction of commercial vehicles on this principle by the makers, who have adopted a special form of suspension to allow solid tyres to be us-d satisfactorily. The **Compagnie de l'Industrie Electrique et Mécanique** also exhibited combined petrol-electric cars.

Nothing very novel in the way of electric vehicles, pure and simple, was to be seen, though all the well-known Continential makers were represented, and the **Electromobile Company** were conspicuous amongst them. The general tendency appears to be in the direction of adopting a single motor instead of two, and of arranging this in conjunction with a live-rear-axle.

It would be impossible to even mention the numerous exhibits of those firms manufacturing petrol engines alone, but the stall of the **Aster Company** as also of the **Compagnie Internationale d'Electricité** was very prominent in the body of the hall. The former Company not only exhibited the latest types of their well-known engines, but we also noticed a neat little reversing gear for small launches, which they have put upon the market. The "ahead" and "astern" clutches are of the internal cone type, and are completely enclosed in the casing. The hand-lever is normally held in its neutral position by a central notch in a foot pedal forming the quadrant for it, and can only be moved in the one direction or in the other, when the pedal is depressed; when travelling ahead, a direct-through-drive is obtained and the gearing is only introduced for astern. The engines of the Compagnie Internationale d'Electricité are made in various sizes, having one, two, three, or four cylinders. The 24–30-h.p. motor has its four cylinders cast separately, mechanical inlet-valves opposite the exhaust, and high-tension ignition. The crank-shafts are made of nickel steel, and the engines appeared to be well and strongly made.



PARIS SALON.—Two views of the 25-h.p. Tony Huber Chassis. Showing the engine, with its copper-jacketed steel cylinders, and the change-speed-gear, with its differential countershaft.

Although comparatively few motor bicycles were on view, yet we noticed one or two models of somewhat unusual design. One of these—the **Auto Roue Roux**—is constructed on the principle of the "ring-rail," the motor being mounted inside a spokeless wheel, and held in place beneath by a driving pulley, and at each side by guide pulleys with springs. In the "**Moto-Cardan**" the engine is fixed well forward beneath the frame, with its crank-shaft lying longitudinally, and the power is transmitted from it by a propeller-shaft to bevel-gearing driving the rear wheel. The propeller-shaft slopes slightly outward to miss the tyre of the wheel, and consequently the teeth of the bevel-gears are cut at an unusual angle. In some of these machines a two-speed gear is introduced between the motor and the cardan-shaft. The **Dutemple** bicycle motor has a single cylinder, but has two connecting rods, which are attached to two parallel crank-shafts. Universally-jointed shafts pass rearwardly from each of the crank-shafts (which revolve in opposite directions) and carry small friction wheels which can be brought into contact with the tyre of the rear wheel, lying between them.

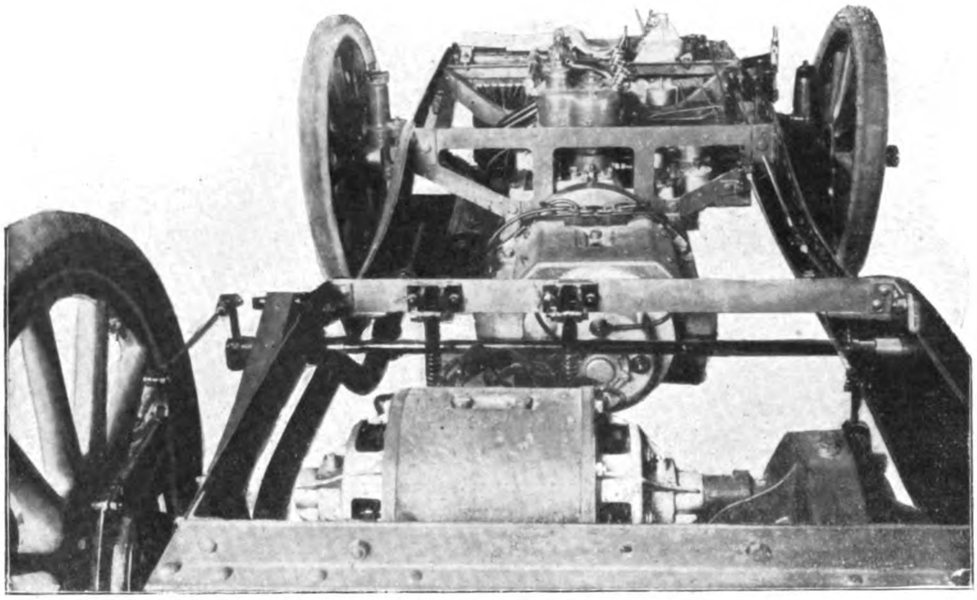
Several combined petrol-electric vehicles were again shown by various firms. The **Krieger** model has a 4-cylinder engine fitted with mechanical inlet-valves, coupled direct to a large dynamo placed beneath the front seat. The power is transmitted electrically to a pair of motors, which drive the rear wheels through gearing, and a small battery of 15 cells is employed for assisting in the excitation of the field magnets of the dynamo, and of the motors, all of which are wound in a special manner, with series, with shunt, and with separate exciting windings. The **Electrogenia** chassis is shown in the accompanying illustrations. The 4-cylinder 16-h.p. Aster engine is fixed low down in front, and the dynamo

The only steam cars for private use were the **Gardner-Serpollet** and the **Chaboche**, both of which firms had interesting stalls, that of the former in particular attracting considerable attention owing to the presence of the fifth vehicle which this firm has built to the order of the Shah of Persia; this is a 15-h.p. vehicle weighing 900 kilogs., and capable of running 200 miles without refilling the tanks; it has a pressed steel frame, and seating capacity for four. The latest standard model, which is being introduced for 1904, differs materially in radical respects from previous types. It is normally of 9-h.p., and weighs 640 kilogs. The combined oil and water pumps have been dispensed with, the fuel being fed under pressure from the tank direct to the burner. The engine itself is much as before, and drives the live axle by a twin roller chain. A large eccentric is fitted on the back axle, and this works the feed-water pump and the mechanical lubricator. A hand-lever on the right of the steering pillar regulates the water and the fuel valves, and another on the left works the variable cut-off and reversing cam-gear. The generator has only six coils, which are made of nickel-steel tubes, and are considerably larger in diameter than formerly. The burner has four pipes, in each of which there are four holes, thus giving sixteen jets in all; quite a small tubular vaporiser is employed in conjunction with it. A large finned tube condenser forms the front of the bonnet, the water-tank is fitted beneath the bonnet, and a large multitubular condenser is placed horizontally beneath the front portion of the vehicle. In the 15 and 40-h.p. vehicles the fuel and water pumps are still inter-connected; in the one they are operated by a stepped cam as before, and in the other from a pair of eccentrics, with a kind of link motion between them. The new **Chaboche** car, although the same general system as before is retained, differs radically in arrangement, and might easily be mistaken at first sight for a petrol vehicle. It has a pressed steel frame, with tapering side members, and the engine is placed vertically in front of the dash beneath a bonnet. The change-speed-gear is mounted in the crank-chamber, and the power is transmitted from it to the live-rear-axle by a very long universally-jointed propeller-shaft. The fuel tanks are placed across the frame, beneath the front and rear seats, whilst the pressure drum and the automatic devices are arranged beside the engine, forward. The generator is fixed right behind. No radius rods are used, the rear springs having shackles only at the back ends instead. A radiator of the G. and A. type, which forms the front of the bonnet, serves as the condenser, and a belt driving fan is mounted immediately behind it. The chassis has a very long wheel base, is substantially constructed, and does not look anything like so complicated as did the previous models.

Several makers showed heavy vehicles of various kinds; amongst these we noticed the **De Dion** delivery vans, in which the same form of transmission and the same engines are used as on the light touring vehicles, except that the cardan-shafts drive the rear-wheels through speed-reducing spur gearing, instead of direct. The **Peugeot Company** exhibited a 'bus and a delivery van, both of which had solid rubber tyres. They have an unusually wide track, and are equipped with twin-cylinder vertical engines placed beneath the driver's seat. The engines are of the new 12-h.p. type, to which we have already referred, and are fixed transversely in the chassis. The change-speed-gear lies alongside them, giving four speeds and a "reverse," and the rear axle, which is of the live type, is driven by a single central chain—somewhat similar to the Renolds silent chain. The **Mathian Lurry** is a very substantially constructed vehicle, which is provided with a large two-cylinder petrol engine in front. The wheels are shod with steel tyres, the frame is carried on long semi-elliptic side-springs, the change-speed-gear is of the sliding spur-wheel type, the rear wheels are driven by side-chains, and a multitubular radiator is fitted in front; this lurry has a very business-like appearance. The **Hagen Company** exhibited the chassis of a large 12-h.p. petrol lurry which takes a platform having an area of 3·64 square metres. This maker's well known variable-speed-gear, in which free-wheel clutches are employed in conjunction with a variable-throw crank-pin, is used. The rear wheels are carried inside the outer frame, and their axle is driven direct by the gear mechanism. The main portion of the frame is made of channel steel, and the wider, outer frame of wood. The "Juggernaut" of the show was the **Larbodier** 50-h.p. steam wagon, which weighs ten tons, is seven metres long and two metres wide over all. It has a large vertical boiler in front and a two-cylinder, compound, vertical engine behind it, in the cab. The power is transmitted to a live axle through a propeller-shaft, and there is a large central radius-rod beneath the propeller-shaft. The **Bardon Company** showed one of their 8-h.p. camions, as also a combined engine and change-speed-gear, similar to that illustrated by us on December 12th last. The **Thirion** fire engine has a two-cylinder 15-h.p. horizontal petrol-engine, in which the cylinders are arranged, on opposite sides of the crank-chamber. A two-way clutch is provided, by which it can be connected with the fire-pumps, or to a propeller shaft driving the live-rear-axle. A change-speed-gear, giving three forward speeds and a reverse, is fitted, and magnetic clutches are employed for bringing the required gear into use—the gear wheels being at all times in mesh with one another. Mention too should be made amongst the heavy vehicles of the **Scotte** train.

Messrs. Turgan, Foy and Co., and the **Decauville Company** both exhibited petrol driven coaches constructed for running on ordinary railways. The Turgan-Foy machine is driven by a 4-cylinder 16-h.p. engine, from which the power is transmitted to one of the axles through a change-speed-gear giving three speeds and a reverse. The two axles are coupled together by outside connecting rods. We understand that the coach is capable of running at a speed of about 18 m.p.h., and that, except for a few such cars made by the Daimler Company at Cannstatt, it is the only petrol driven type in actual service on rails in Europe. The Decauville model has a 16-h.p. engine, and the engine and the gear are suspended beneath it, driving one of the axles. Messrs. Turgan and Foy are now also building touring vehicles of which they showed four sample chassis, two with twin-cylinder engines, and two with 4-cylinder engines.

Reference has already been made to the development shown in connection with pressed steel frames, and it has been pointed out that they are frequently provided with underframes for carrying the engine, the gear-box, and both. Some of the interesting forms, including several patterns in which the entire frame is made in one piece, will be illustrated in our next issue, and it will be remembered that the Darracq frame, which forms a partial sheathing around the engine and the gear-box, has already been illustrated in our columns (December 12th, p. 1339).



PARIS SALON.—The Electrogenia combined petrol-electric chassis, showing the engine and dynamo in front, and the electric motor, which drives the rear axle, behind.

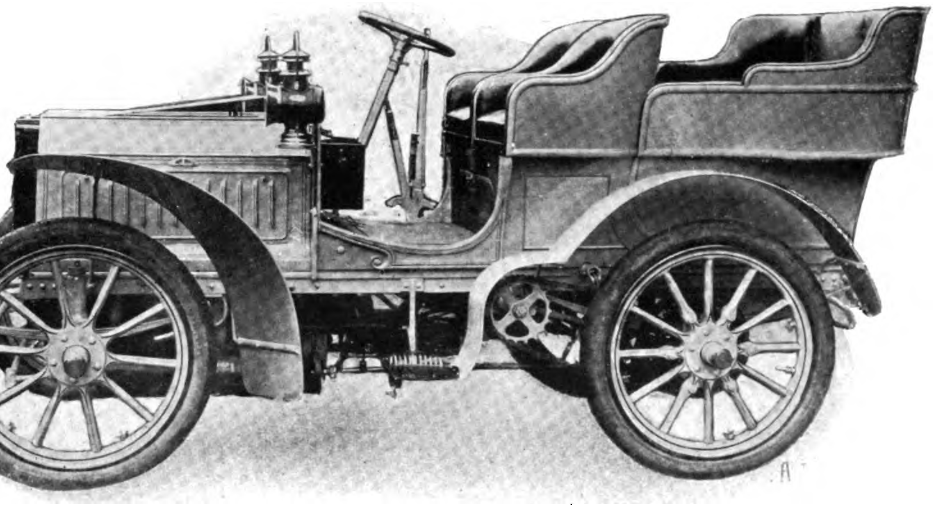
1,000 MILES RELIABILITY TRIAL.

Technical and Descriptive Data Concerning the Competing Cars in order of Official Numbers (*Concluded*).

Class F (*Continued*).—Cars more than £700 and not more than £900.

12-h.p. Peugeot (No. 119).—Three non-stop runs were recorded, and on four of the other days marks were alone lost in consequence of a water-leak which necessitated re-filling occasionally, and was not sufficiently accessible to repair without considerable delay. Twenty-five marks in all were lost in this way, and a further two, on another occasion, for lubricating. Garage marks were also lost in consequence of the water-leak, and a few more for attending to the belt-driven fan, apart from ordinary replenishing and lubricating. This 4-cylinder vehicle is in general respects similar to the twin-cylinder model (No. 71), but it has a pressed steel frame, to which the engine and gear-box are fixed direct. Both high-tension and magneto-ignition are employed, and the mechanical-inlet-valves are placed on the opposite side of the cylinders to the exhaust-valves. The compression is about 90 lbs. per square inch, the normal speed 900 revolutions per min., and the output at 1,400 revolutions per min.; is about 16-b.h.p.

20-h.p. Germain (No. 120).—On three days the ignition system was responsible for a loss of 73 marks, and 5 more marks went on one of these days for replenishing with water on the road; on the other five days non-stops were recorded. The ignition too, caused a loss of a considerable number of garage marks. these amounted to 68 on the first evening, and a few more during the rest of the time. This car is similar to the 15-h.p. model (No. 96), though the wheel base is slightly longer and the mechanism is more powerful; the engine can develop about 24-b.h.p. at 1,200 revs. per min.



1,000 MILES RELIABILITY TRIAL.—The 20-h.p. Germain Petrol Car (No. 120).

20-h.p. Beaufort (No. 121).—A non-stop run was made on the second day, but otherwise a considerable number of reliability marks were lost through various causes. On the first day 10 marks went owing to oil in the cylinder, and 2 for adjusting the carburettor. On the third day only 1 mark was lost, and that through gear trouble. On the fourth day 18 marks, on the fifth 71, on the sixth 26, on the seventh 101, and on the eighth 33, of which 5 were for tyres, went in consequence of delays caused chiefly by trouble with the ignition apparatus, through the carburettor and from the engine overheating. Similar trouble in garage also resulted in a large loss of marks.

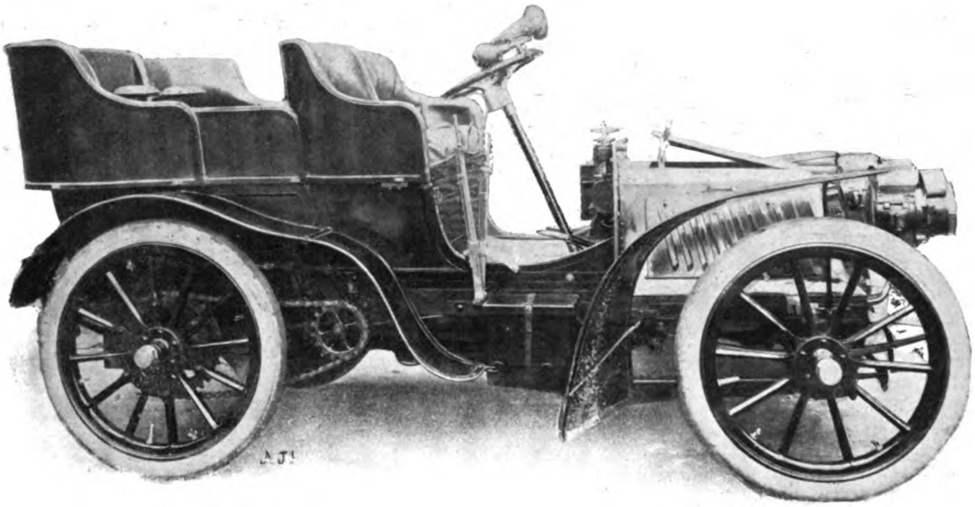
20-h.p. Humber (No. 122).—Three non-stop runs were actually made, and on one other day tyre troubles were alone responsible for the loss of 10 marks. The petrol occasioned some little delay on the first two days, which, together with a broken plug, cost 54 reliability marks. On the remaining days 2 marks went in refixing the accumulator box and 7 in replacing a spark plug. The ignition apparatus and the battery box led to some little loss in garage, where 8 marks also went for tyres, and 3 for adjusting the exhaust pipe; otherwise the garage deductions were for replenishing and lubricating. The vehicle has a tubular main frame and underframe, and is similar to the smaller model (No. 117). The engine has mechanically-operated inlet-valves, however, arranged opposite the exhaust valves, its normal speed is 900 revs. per min., and it gives about 30 b.h.p. at 1,400 revs. per min. A Longuemare carburettor is used, and high-tension ignition is employed. The front of the vehicle is supported above the front axle on a transverse spring. The wheel base is 9 ft. 6 in., the track 4 ft. 3 in., the front tyres are 870 mm. by 90 mm., and those on the driving wheels are 850 mm. by 120 mm.

12-h.p. Wilson-Pilcher (No. 123).—As already reported, a gear-wheel driving the pump and commutator-shaft came loose inside the gear-box, owing to its not having been locked, and this led to the retirement of the car on the first day. This car is similar to the 10-h.p. model described with illustrations in our issue of January 31st last, and is constructed on the maker's special system. The 4-cylinder, horizontal, balanced engine has atmospheric inlet-valves, runs at a normal speed of 900 revs. per min., and will develop about 16-b.h.p. at 1,300 r.p.m.; the compression is about 100 lbs. per square inch. Four forward speeds are provided by the special epicyclic gearing, the top speed being a direct-through-drive to the gear-wheel driving the live rear-axle. The "reverse" is fitted on the back axle, so that the same speeds are available in both directions. All the gears are introduced by special friction clutches, which are externally adjustable. Roller bearings are used in the gear-box, and the gear-wheels throughout the car are of special construction; those driving the back axle have spiral teeth, and those in the change-speed gear having double helical teeth. The Company's special high-tension ignition system, which we described in our issue of March 7th last, is used, and the carburettor is of the spray type. The wheel base is 7 ft., the track 4 ft. 2 in., and the wheels are shod with 910 by 90 Dunlop tyres.

25-h.p. Maudslay (No. 125).—After a non-stop run on the first day, delays were experienced, and the car subsequently retired on the sixth day through trouble with the ignition apparatus. We understand from the makers that the cause of this, which was not however ascertained until after the withdrawal of the car, was that the commutator on the dashboard tended to overrun the engine slightly, and in so doing, severed the electric circuit formed through the flexible coupling driving it. A balanced form of commutator, having a certain amount of friction, had previously been used by them, and they had failed to realise that the substitution of the new form of commutator would lead to this result. This car was fully described, with illustrations, in our issue of March 14th last; the wheel base is 7 ft. 6 in., the track 4 ft. 5 in., and the wheels were fitted with 36 in. by 5 in. Dunlop tyres.

16-h.p. De Dietrich (No, 126).—Only four reliability marks were lost, although but five non-stop runs were recorded; 3 of these marks went for replenishing on the road, and 1 for a stop on a hill. In garage 5 marks went for attending to the tyres, and a further 3 in fitting a new nut and bolt to one of the chains. This well-known vehicle has an armoured-wood main frame and an angle steel underframe, a 4-cylinder engine with atmospheric inlet-valves, Simms-Bosch magneto ignition, and a spray type of carburettor; the normal speed of the engines is about 700 revs. per min. The clutch-spring is arranged vertically just behind the fly-wheel, and is easily accessible for adjustment. The wheel base is 7 ft. 7 in., the track 4 ft. 7 in., and the wheels, which run on plain bearings, are shod with 870 by 90 mm. Michelin tyres.

15-h.p. C.G.V. (No. 127).—During the first three days, 32 reliability marks were lost in connection with the accumulator, the clutch, and one tyre trouble (5 marks), but after then five consecutive non-stop runs were recorded. Apart from replenishing and lubricating, a few garage marks were lost from the same causes. The vehicle, which had, we are informed, already travelled over 20,000 miles. Its main frame is constructed of square steel tube filled with hickory under pressure. The engine has atmospheric inlet-valves, runs at a normal speed of 720 revolutions per minute, and will give about 22 b.h.p. at 1,300 revolutions per minute. Hign-tension electric ignition is used, and the carburettor, which is of the float-feed type, is water-jacketed. The clutch is of the ordinary cone type, and the power is transmitted from a gear-box, of the Panhard type, by side-chains connecting the differential countershaft with the rear wheels. The wheel base is 6 ft. 9 ins. the track 4 ft. 10½ ins., and the wheels, which run on ball-bearings, have 870 by 90 Clincher-Michelin tyres.



1,000 MILES RELIABILITY TRIAL.—The 15-h.p. Pipe Petrol Car, with Magnetic Clutch (No. 129).

18-h.p. Chenard and Walcker (No. 128).—This vehicle was not finished in time to take part in the trials, although it ran during the first day; it was, therefore, withdrawn. In general respects it is constructed on the same lines as the 14-h.p. model, described by us in our issue of April 11th last, but has a larger engine, and is improved in many respects. We referred to it briefly last week in connection with the Paris Salon.

15-h.p. Pipe (No. 129).—Three non-stop runs were made, and the trips on three of the other days were only spoilt in having to renew the carbons for the magnetic clutch, costing 1, 2, and 3 marks respectively on these occasions. On the first day, the carburettor caused delay, representing 20 marks, ond two more marks went in replacing a spark-plug. The clutch (4 marks) and an engine trouble (3 marks) occurred on the remaining day. In garage a few marks went on five different occasions for starting, and one or two more for replacing plugs, adjusting a brake, and attending to the tyres, apart from replenishing and lubricating. The car does not differ materially from that described by us in our issue of Dec. 20th, 1902, except that it is fitted with the Jenatzy magnetic clutch, with which our readers are familiar (Vol. VIII., page 693). The engine has mechanically-operated inlet-valves arranged on the same side as the exhaust-valves, the cylinders are cast in pairs, and the engine is governed on the throttle. Its normal speed is 750 revs. per min., and the compression is about 70 lbs. per sq. in. High tension electric ignition is used, and the carburettor is water-jacketed. The wheels run on plain bearings and are shod with 910 by 90 mm. Clipper-Michelin tyres. The wheel base is 7 ft. 1 in., and the track 4 ft. 6 in.

15-h.p. Rochet-Schneider (No. 130).—Five non-stop runs were recorded, 2 reliability marks were lost by a clutch trouble, 2 for adjusting the magneto, and 1 in attending to a brake. In garage, 5 marks were lost for making minor adjustments apart from replenishing and lubricating. The car is similar to that described with illustrations in our issue of May 9th, 1903. The wheel base is 7 ft. 8½ ins., and the track about 4 ft. 5 ins.; the wheels, which run on ball-bearings, were shod with 910 by 90 mm. Michelin tyres.

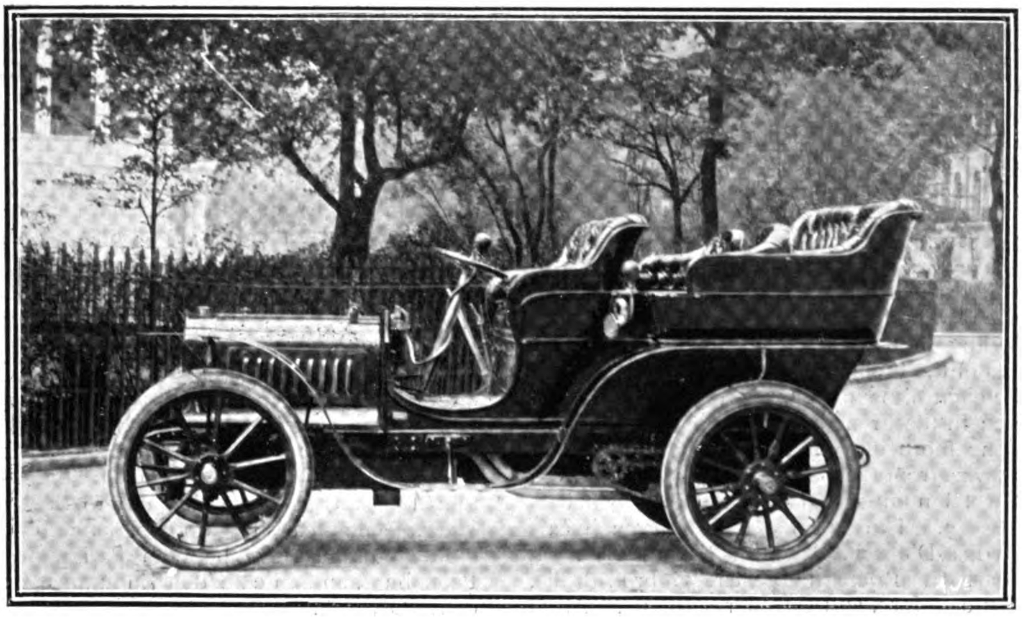
18-h.p. Mors (No. 131).—During the first four days, 61 reliability marks were lost through various small troubles on the road, including cleaning spark-plugs, making sundry adjustments, replenishing, and one tyre trouble; on the fifth day the car had to retire at Ewell owing to a collision with a gate in the fog. It has a pressed steel frame, and the engine is carried on an underframe. Mechanically operated inlet-valves are arranged on the opposite side of the cylinders to the exhaust-valves. The normal speed of the engine is 1,200 revolutions per minute, and it is capable of developing about 22 b.h.p. at 1,300 revolutions per minute. A low-tension magneto system of ignition is employed, and the carburettor is of the float-feed spray type. A circulating pump of the gear-wheel type, which is gear-driven from the engine, is employed in conjunction with a honeycomb radiator, behind which a belt-driven fan is fixed. The gear is of the Mors well-known type, giving four speeds and a "reverse" with a direct-through drive on the top speed. Clincher-Michelin tyres, 920 by 120 mm., are fitted, the wheels run on plain bearings, the wheel base is 7 ft. 8 in., and the track 4 ft. 7 in.

20-h.p. Holcar (No. 132).—This vehicle retired on the first day owing partly to tyre troubles, and largely because it was the Co.'s first experimental car, no other machine being ready in time. It has a trussed channel iron frame, and differs considerably from other cars in several respects. The engine has its four cylinders placed diagonally, and the inlet-valves are operated mechanically. The compression is about 70 lbs. per square inch, and the normal speed about 850 revs. per min. High-tension ignition is used, and the carburettor is of a special pulsating type, having no float-feed device. The cylinders are water-jacketed, the radiator is arranged round the engine, and the centrifugal pump is gear-driven. A double-grip main-clutch is used, and the change-speed-gear is of the epicyclic pattern. The power is transmitted to the live-rear-axle by a propeller-shaft, and the road-wheels run on tubular extensions of the stationary portion of the axle. The wheel base is 7 ft. 9 ins., the track 4 ft. 7 ins., and the wheels are shod with 32 in. by 4 in. new Grappler tyres.

20-h.p. M.M.C. (No. 133).—No delays on the road occurred except on the sixth day, when 9 stops were made for ignition troubles, and no less than 58 marks were lost; otherwise non-stop runs were recorded throughout the trials. In garage, on the evening of the sixth day, 119 marks were lost in overhauling in the repair tent, presumably in connection with the ignition troubles of that day, but otherwise, except for 5 marks deducted through replacing a plug and adjusting the commutator, the only garage marks lost were for replenishing and lubricating. This car, which gained the silver medal in its class, has an armoured wood frame and no underframe; the engine has mechanically-operated inlet-valves, arranged on the same side as the exhaust-valves. Its normal speed is 1,050 revs. per min., at which it develops about 25 b.h.p., and at a speed of

1,200 revs. per min. it gives about 26½ b.h.p.; the compression is about 65 lbs. per sq. in. The ordinary high-tension electric ignition was fitted, as also the Eisemann high-tension magneto system. The radiator is of the Albany tubular type, and has a gear-driven fan behind it; the centrifugal pump is also driven by gearing. The M.M.C. gear-box, in which the toothed-wheels remain in mesh with one another, gives three forward speeds and a "reverse," the power being transmitted through it to a differential countershaft driving the rear wheels through side-chains. The wheel-base is 8 ft. 1½ in., the track 4 ft. 5 in., and the wheels, which run on plain bearings, were shod with 870 by 90 mm. Michelin tyres. The M.M.C. cars were fully described by us on October 11th, 1902.

speed of 750 revs. per mm.; at 1,100 r.p.m., it is capable of developing about 27 b.h.p. High-tension electric ignition is employed, the carburettor is of the Maybach float feed type, and the Co.'s fan-cooled radiator is fitted. The centrifugal circulating pump is chain-driven, and the fan is belt-driven. The gear-box gives four speeds and a "reverse"; and the countershaft has ring-lubricated bearings. Two compensated brakes are mounted on the ends of the countershaft, and the pedal which operates them is inter-connected with the clutch; the hand-brake, which acts on both rear-wheels, and is also arranged with a compensating device, is not connected with the clutch. The body is hinged to render the chassis readily accessible, and the maker's curved dashboard is fitted.



1,000 MILES RELIABILITY TRIAL.—The 18-h.p. Mors Petrol Car (No. 130.).

16-h.p. F.I.A.T. (No. 134).—Five non-stops were made, and on the other days, 4 reliability marks were lost for cleaning the clutch on two occasions, and 16 for cleaning the carburettor on two other occasions. Except for replenishing and lubricating only 2 garage marks were forfeited, these being for pumping a tyre. A fully illustrated description of this actual vehicle was given by us on December 5th last.

Class G.—Cars more than £900.

22-h.p. Daimler Brake (No. 136).—This vehicle, which was awarded a special gold medal for general excellence, and carried ten passengers, made five non-stop runs, and on one of the other days only lost one mark for petrol troubles. On the sixth day 103 reliability marks were forfeited in consequence of a broken tooth in the differential gear, and on the remaining day the battery occasioned a loss of 1 mark, and a chipped bevel wheel 24. Apart from replenishing and lubricating, re-making an exhaust joint cost 3 garage marks, the differential gear 4, and "adjusting" another 4. The car is a duplicate of that supplied to the King, and is constructed on the well-known Daimler lines. It has a special form of armoured wood frame, to which the engine and the gear-box are fixed direct. The engine has atmospheric inlet-valves, has a compression of about 70 lbs. per square inch, and runs at a normal The wheelbase is 10 ft. 6 in., and the track 4 ft. 9 in. The rear wheels were fitted with 36 in. by 4 in. Goodyear solid tyres, and the front wheels 36 in. by 5 in. pneumatics.

22-h.p. Daimler (No. 137).—It will be remembered that this car, which was awarded the Gold Medal in its class, was one of those which made non-stop runs daily throughout the trials. In garage, apart from replenishing and lubricating, 20 marks in all were lost for testing and making small adjustments. The chassis is practically identical with that of the brake (No. 136), except that the wheel base is 8 ft. and the track 4 ft. 5 in. The wheels were shod with 870 by 105 mm. Michelin flat-treaded tyres, and the car was geared about 30 per cent. higher than the other.

24-h.p. De Dietrich (No. 140).—Non-stop runs were made on each of the last six days, and 12 reliability marks were lost on the first two, these being for replenishing, cleaning the inlet-valves, and for a momentary stop on a hill. In garage four marks went in adjusting the foot-brake, but otherwise deductions were only necessary for replenishing and lubricating. The design of this car is practically identical with the 16-h.p. model (No. 126). The b.h.p. of the engine at normal speed is about 30, the wheel base is 7 ft. 7 in., and the track is 4 ft. 7 in.; Michelin tyres were fitted, those on the back wheel being 920 by 120 mm., and those on the front 910 by 90 mm.

HENRI FOURNIER is not only an experienced and fearless driver of racing automobiles, but is a man with shrewd business judgment. He has just taken up the sole agency for the Oldsmobile car in France under arrangement with Messrs. Charles Jarrott and Letts, Limited, having previously, by practical experience, satisfied himself in regard to the qualities of this little runabout.

IN very convenient form for the pocket, a memo-booklet is to hand from the Continental Caoutchouc and Gutta Percha Company, Limited. The interior is not taken up with a lot of superfluous contents, and beyond the depôts of the firm in England and abroad, and a speed table, the entire book is available for memorandum. On the back and front covers calendars for 1904 and 1905 are given.

RACES, RECORDS, AND TRIALS.

GORDON BENNETT CUP RACE.

BRITISH makers who have entered cars for the Eliminating Trials on behalf of Great Britain are the Wolseley Company and the British Darracq Company, in addition to S. F. Edge, Limited, with 5 Napiers, and J. E. Hutton, Limited, with the special cars now being completed. Of the three Wolseley cars, two will be of 96 nom. h.p., and the third 72 nom. h.p. There will be many novel points embodied in their construction, and the surface exposed to wind pressure will be reduced to the lowest possible point. The design of the car also provides for the centre of gravity being brought extremely low, and the horizontal 4-cylinder type of motor will be retained as being deemed particularly suitable for a racing car, enabling corners and bends in the road to be negotiated at a very high rate of speed. The British cars must be ready for the Eliminating Test on April 16th. In the event of the proposal to have part of the test over the Circuit des Ardennes being carried through, the timing for the British cars will probably be done by representatives of the British club, and in the case of the French cars by representatives of the French club.

Beyond the eight firms mentioned by us last week as having entered in the French Eliminating Trials, as we anticipated, one more entry was received after we had gone to press, viz., from the Gardner-Serpollet Company, bringing the total number of cars entered on behalf of France up to 29. The full list of the French cars entered are: De Dietrich, Panhard, Bayard Clement, Darracq, Mors, G. Rochard Brasier, Gobron-Brillie, Hotchkiss, Turcat-Mery, and Gardner-Serpollet. All of these have entered three cars, with the exception of Turcat-Mery, who have two. Renault Frères have determined to abstain from taking part in this year's contest, owing no doubt to the fearful calamity in the Paris-Bordeaux race which cost Marcel Renault his life.

The French Club, before deciding to make use of the Ardennes course, propose to arrange, if possible, for an eliminating "circuit" in France, but before taking serious steps in this direction, the Government authorities are to be approached and a definite answer obtained, Yes or No, whether authorisation would be given to the race being held in the event of such a course being located and proper precautions taken for the protection of the public during the event. The French club have in hand nearly £6,000 in entrance fees for the purpose of providing against the expenses, and this should therefore be ample to provide for every necessary precaution which the French authorities might require.

For America, the definite entries received by the A.C. of America are (1), from Peter Cooper Hewitt, of New York, son of the late Ex-Mayor Abram S. Hewitt, with a car of his own design, now nearing completion at the Trenton Iron Works, Trenton, N.J.; (2), Alden Sampson; and (3), the Peerless Motor Car Co., of Cleveland, who also came forward at the last moment to represent America.

THE automobile meeting at Milan arranged by the A.C. of Italy from May 11th to the 15th will, in addition to the endurance trial lasting four days, also include speed trials on the flat and on hills.

ON the Daytona-Ormonde Beach (California), on January 1st, Nestmann, on a Stevens-Duryea car, covered the mile in 57⅕ sec., and the kilometre in 35⅕ sec. The next day Schmidt, on the Packard "Gray Wolf," covered one mile in 50⅖ sec., and 5 miles in 4 min. 21⅗ sec. Schmidt's best kilometre time was 31⅕ sec.—all new American records. Again, on the 3rd, Schmidt eclipsed his earlier performances, putting up 29⅖ sec. for the kilom., 46⅖ for the mile, and 4 min. 21⅗ sec. for the 5 miles.

A RACE for motor bicyclists on the Paris-Bordeaux road is under consideration by the Auto Cycle Club of France.

THE Spa authorities have offered gratis a site for the construction of a motodrome, and a scheme to carry out the idea is now under consideration.

BETWEEN Milan and Nice a trial for motor wagons is to be organised by the *Gazetta dello Sport* during the coming season. The military authorities have arranged to watch these trials and follow them, so far as they take place on Italian soil.

FOLLOWING the date of the Gordon-Bennett Cup Race the Moscow Automobile Club propose organising a tourist "caravan" from that city to St. Petersburg and Kiew. The idea is to gain experience by this run for a more ambitious tour between Paris, Moscow, and St. Petersburg, and an extended Endurance Trial in Russia of 1,500 versts.

WHEN the entries closed on December 31st at single entrance fees for the Monaco motor boat races in April next, 76 boats had been entered, comprising 38 racers, 29 cruisers, 7 bossoirs, and 2 fishing boats. Mr. S. F. Edge's "Napier Minor" comes into the 8-12 metre class, last year's Napier boat, now the property of M. Henri Deutsch, being classed in the 12-18 metre class. No less than eight Ader boats are entered in the various classes, including one in the racing section, and three boats each by Bayard-Clement, Dalifol, and Titan are entered. The other leading boats we mentioned last week when we published the full regulations and programme of this important event. The entries, at double fees, finally close on the 15th inst.

THE growing general interest in motor boats is illustrated by a somewhat ambitious article on the subject in the Winter and Mediterranean number of the *Yachting World* on "The Future of the Motor Boat." The article is well illustrated by examples of the application of the petrol motor as an auxiliary means of propulsion to small sailing vessels, and from that point of view is suggestive and calculated to stimulate interest in the subject.

M. RIGOLLY, who has made during the past year such sensational times on his 100-h.p. Gobron-Brillie, using alcohol as fuel, has been decorated with the Green Ribbon of Merit by the French Minister of Agriculture for the services which he has rendered to agricultural interests in France.

CLUB DOINGS.

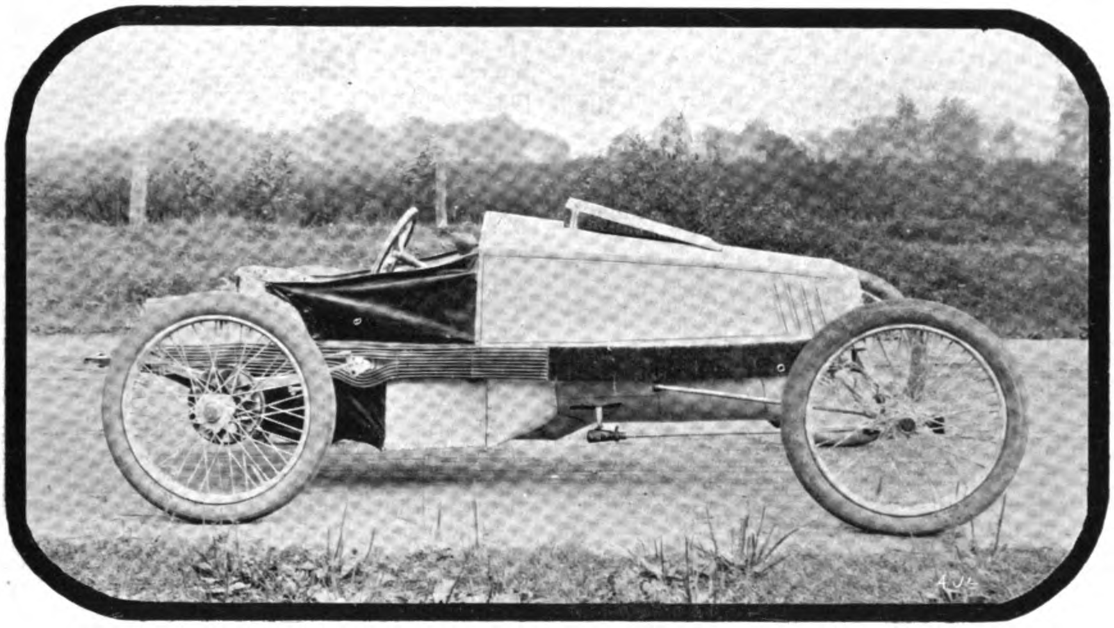
Sheffield Automobile Club.—Although rain and sleet were experienced at the start, the Non-stop Run organised by this club for Boxing Day was successfully carried through, seven cars taking part. The run was from Sheffield to Newark, *viâ* Worksop, and back to the Hop Pole Hotel at Ollerton. Soon after leaving the Sheffield Town Hall, where a considerable number of the public had gathered to witness the send-off, the weather considerably brightened, and, although the roads were most of the way in an extremely heavy condition, particularly between Sheffield and Worksop, the legal speed-limit was well maintained throughout. Of the seven cars which started, four completed the distance without a hitch of any sort, viz., Mr. B. Hinde's 9-h.p. Clement, Mr. J. E. Evans' 12-h.p. Darracq, Mr. J. H. Pickford's 10-h.p. Wolseley, and Mr. B. Shaw's 6-h.p. De Dion. The three who were unfortunate in having slight mishaps were Mr. J. Hinde on a 6-h.p. La Plata, who within a few minutes of the finishing point ran short of petrol; Mr. J. F. Pickering on a 10 h.p. Norfolk, and Mr. C. A. Clark on a 6-h.p. Gladiator, both of whom had ignition troubles. The arrangements for the trial were admirably carried out under the direction of Mr. F. B. Cawood and Mr. E. F. Coupe. The observers acting on the different cars were Messrs. J. T. Thompson Lindley, J. Needham, W. James, C. Holden, and G. D. Flather.

The Automotor Journal stand is No. 91 at the Society of Motor Manufacturers' Exhibition, opening at the Crystal Palace on February 12th.

Mr. Harvey du Cros, at the next General Election, will be recommended by the Candidate Committee as Parliamentary candidate for Hastings, to oppose Mr. Freeman Thomas, M.P.

Turner's Motor Manufacturing Company, Limited, of Wolverhampton, have purchased the Wulfruna Cycle Works in that town for the purpose of increasing their output of the Miesse steam car.

The Long Acre Motor Car Company (Limited) have removed to new premises at 1 to 5, Poland Street, W., and at the same time have changed their title to the Lacre Motor Car Company (Limited), to avoid misconception in regard to their address; otherwise there is no alteration whatever in the construction of the Company.



The Packard Racer, "Gray Wolf," on which Schmidt has this week broken all previous American records for the kilometre, the mile, and for 5 miles. The car has a pressed-steel frame, mounted on semi-elliptic side-springs at the rear, and an inverted transverse spring in front. The 24-h.p. engine has four cylinders, and is governed on the throttle. The change-speed-gear, which gives three forward speeds and a "reverse," is combined with the live-rear-axle, and is enclosed in the same casing with it; the shafts and axles have ball bearings. The car weighs 1,310 lbs. in running order.

South Lincolnshire Automobile Club.—Under this title a club has been formed. Mr. W. Garfit, M.P., has been invited to become President, with the following as supporters:—Lord Willoughby de Eresby, M.P., the Marquis of Exeter, the Earl of Ancaster, Alderman Joseph Cooke (Mayor of Boston), Mr. H. R. Mansfield, M.P., Mr. G. H. Faber, Mr. E. M. Pollock, Mr. R. W. Staniland, and Mr. Meaburn Staniland. Dr. Miller will act as chairman of the committee.

The Annual General Meeting of the Yorkshire Automobile Club will be held on the 14th inst., at the Great Northern Hotel, Leeds. As already announced, a lantern lecture by Mr. E. Faiers, of Bradford, will follow the General Meeting.

Our congratulations to Mr. Basil H. Joy, the Technical Secretary of the Automobile Club, on his marriage on Wednesday last to Miss May Gooch, at Datchet.

Mr. George Alexander was this week elected a member of the Automobile Club.

For the future, "Brooke" cars for London and district will be entirely in the hands of Mr. Bernard B. Redwood, who has secured the sole agency for these excellent vehicles, and will have them on view on the premises of J. E. Hutton, Limited, 81–82, Shaftesbury Avenue, W. In addition to the 3-cylinder standard type and light type cars, the prices of which have been reduced to £450, a new 4-cylinder 20-h.p. car at £500 is being put on the market for 1904. This vehicle, we understand, will contain a considerable number of improvements, and will probably be exhibited at the Agricultural Hall.

WE cannot help commiserating the Marquis de St. Mars on being summoned for exceeding the speed limit in Hyde Park on almost the last day on which the old Act remained in force, after a six years' unsummoned record in this country. He was fined £2 and 2*s*. costs. The policeman, of course, maintained he was going 28 miles an hour (presumably with an eye to the new Act), so, perhaps, the Marquis was not so unlucky as he supposed in not being summoned a few days later.

IN reference to the article on the Edison battery in last week's AUTOMOTOR JOURNAL, a correspondent points out that it is only at high rates of discharge (in the neighbourhood of 150 ampères) that the loss of capacity that would result from stopping the discharge at 1 volt would amount to more than 10 per cent. At 30 ampères, he states, it would only be 2·9 per cent. Our correspondent also considers that we underestimated the cost of replacing the positives in lead batteries. Manufacturers' figures, of course, differ, but our correspondent's estimate—of upwards of 27 per cent.—appears extraordinarily high.

OUR contemporary, the *Surrey Times*, is, of course, still opposed to the 20-mile speed limit. In an article dealing with the new motor law, it says that though the reckless or dangerous clause may be sufficient to protect the public, "the public will not think so as it sees the cars whizz by at a good 20 miles an hour in thoroughfares which are certainly not free from other traffic, vehicular or pedestrian." Quite so, but that is just what motorists, as we have frequently insisted, must not do when there is considerable traffic about. Let all who are tempted in this way remember that they are giving the text to papers like the *Surrey Times* to agitate for the further reduction of the speed limit when the present Act expires.

THE United Motor Industries catalogue of accessories shows the extremely comprehensive manner in which this firm deals with the accessories business. Almost every form of motor accessory, including such different branches as various makes of tyres, wheels, and even complete change-speed and steering gears, water circulating pumps, radiators, and every kind of lamp, and a variety of sparking plugs, and all the various items of electric ignition, are catered for. As a good example of the extent to which this enterprising company are up-to-date, we would specially mention their "Castle" back-light, which is designed to illuminate the rear number-plates of motor vehicles in accordance with the Act which is now in force.

A SPECIAL Providence sometimes seems to watch over the lives of motorists. At least we conclude a special Providence watches over Mr. Tudor Owen, of the county of Shropshire. His motor car recently ran away with him down the steep street of Shrewsbury which leads along the old Castle Hill to the historical Traitor's Gate. The runaway car got up such a speed that it is reported to have smashed off wooden posts and beams with which it came in contact like matchwood, and finally jumped a high wall into the Severn. With a presence of mind reminiscent of Baron Munchausen, Mr. Owen jumped at the psychological moment, when the car was also executing its leap, and came off unhurt. Mr. Tudor Owen is evidently reserved for something great.

THE Inland Revenue are making what is certainly a sensible concession to car owners and others who hire out carriages. In future, carriage hirers are to pay duty only on the greatest number of vehicles which they have let out on hire at any one time during the year, provided that they will permit the statement to be verified, if desired, by allowing the Board's officers to inspect their books. As, of course, every hirer out of carriages usually has a certain number of reserved vehicles, and as it may only very rarely, and in some cases never, happen, that his whole ordinary stock is out at once, this arrangement will be of distinct advantage to the trade. As a precedent to govern the motor car industry this decision is valuable.

A GOOD sign for the coming season is that the Wolseley Company are a great deal busier than they have ever been before—so busy, in fact, that at their Adderley Park Works, Birmingham, more new shops are being erected, and they contemplate putting on a night shift to keep up with the extreme rush of business which they are now enjoying. The average output during the past year from these works has been at the rate of nine finished cars per week, without taking into consideration a lot of extra work which the Company have carried out for Government Departments. As announced some time ago, the Wolseley Company have acquired extensive works at Crayford, in Kent, and they are now installing the most up-to-date machinery there, which will very shortly be capable of turning out as many as twenty cars per week. The Crayford works will be devoted almost exclusively to the manufacture of the 6-h.p. light car, and as there are grounds of 25 acres in extent attached to them, a track is being constructed for testing the cars before leaving the works.

MESSRS. CHARLES JARROTT AND LETTS, LTD., have practically bought up the British Locomobile Company—that is to say, they have formed a syndicate, of which they are the principal directors, which has purchased that business, and they are now going to combine the extensive garage and works in the Brompton Road with their own business. They will still keep on the same car business, supplying Locomobiles as before, and they have made special arrangements for executing every class of repair that the owners of these machines may require, while, as they have every Locomobile part in stock, everything required can be obtained at 24 hours' notice. They have also at the Kensington works extensive facilities for charging electromobiles. The main idea which Messrs. Jarrott and Letts entertain, however, is to develop the unique extensive garage accommodation in the Brompton Road for the convenience of all owners of cars of whatever build, and as they have a very large staff and extensive works in connection with them, any repairs required can be carried out on the premises. As they are also desirous of entering into business relationships with garage owners in other parts of the town who have not the same facilities for effecting repairs, they will be willing to make special arrangements for doing this class of work for proprietors of such establishments. Mr. Perman, who has made himself so generally known and universally liked while in charge of the Gladiator Company, has been engaged as general manager of the garage, and Mr. George Shave will be works manager.

FIAT MOTORS, LIMITED, of 37, Long Acre, W.C., notify us that they are the sole concessionaires for Great Britain and Ireland of the well-known Fiat cars. We quite recently gave an illustrated description of this system. The new 1904 models will be of 16, 24, and 60-h.p.

IN Mr. E. H. Lancaster's announcement of the Clement cars, for which he is agent, the correct telephone number is as it appears this week, viz., 1970 Gerrard. In our last week's issue the two centre figures unfortunately were reversed. Mr. Lancaster is prepared to consider applications for agencies for the sale of Clement cars in the United Kingdom.

THE lecture on radium delivered by Sir Oliver Lodge on Tuesday last, at Birmingham, with Mr. Chamberlain as chairman, consisted of a summary of practically all that is known about the history, properties, and theories relating to this astonishing substance in Sir Oliver's usually lucid, stimulating, and attractive style. The vista of possibilities opened up by radium is so extensive, and the revolution in our notions of energy which it effects so penetrating, that it is impossible to say whether in the future it may not in some way be pressed into the service of automobilists. At present, however, the suggestion of a Transatlantic contemporary, that it may be used for devising an inextinguishable and ever-ready lamp for motor vehicles and other purposes, is to say the least, a little premature. It is true that radium bromide in close juxta-position to sulphide of zinc produces (apparently permanently) a certain amount of light, but the light is not very powerful and the expense is prohibitive.

WE learn with much pleasure from the Roots Oil Motor and Motor Car, Limited, that their 5-h.p. cars have been giving great satisfaction since their manufacture was taken over by Sir W. G. Armstrong, Whitworth and Company, Limited. The cars have been subjected to a very searching test—running the mails regularly between Newcastle and Sunderland, *viâ* South Shields (a daily trip of 40 miles), for upwards of the last three months. The test has been a very severe one, as the vehicles were originally designed to carry only three persons with a light passenger body. As used for carrying the mails, a small van body about three times the weight of the passenger body has been substituted, and the car has frequently had occasion to carry as much as 7½ cwt. of mails, the total load being therefore about twice the normal. During the rush of work in the Christmas fortnight, the reserve car was also put on, and carried a similar load for the same distance during the day, neither car experiencing anything in the nature of a breakdown, while not the slightest hitch occurred in the service. A steady test of this kind, of some 280 miles every week, at double the ordinary load, is, it must be admitted, a most exhaustive reliability test. The chassis employed is the Roots standard 5-h.p. model with solid rubber tyres, the total weight of the mail van being over 1 ton including the driver. The only alteration that has been made is in the sprockets, which have been changed in order to reduce speed. The average consumption of oil has been 1 gallon for every 16 miles run, which we are informed works out at 0·31 of 1*d*. per ton mile.

VISITORS to the Empire Theatre can always be assured of a splendid programme. On Monday night to the usual entertainment was added a new sensation. "Looping the loop" having been voted fairly tame, a Mr. Barber went one better by riding a bicycle 18 feet through space in mid-air, when riding head downwards. The public preparations occupied some five or seven minutes, but the actual performance was over in considerably under 30 seconds. It was hardly necessary for the injunction, given from the stage, for perfect stillness to be maintained, as at the moment of Mr. Barber's descent from a high point in the wings, the audience involuntarily held their breath in view of the new sensation, and were much relieved when, after a few minutes' interval, the performer appeared in front of the curtain. Unfortunately, after finishing his astonishing performance, he had come in contact with a fire bucket and appeared to have rather badly cut his shin, which gave rise amongst a certain portion of the audience to the suggestion that he had been injured in the actual performance of the feat, which as a fact was not so. The "turn" was *almost* as thrilling as running the gauntlet of the Surrey police on an automobile.

IT is satisfactory to find the daily papers discussing occasionally, sometimes at considerable length, the question of the cheap automobile. A thoughtful article on this subject, in one of our daily contemporaries, points out that the chief obstacle to the cheapening of the cheap car is the hilly nature of the English roads, and draws attention to the fact, which every road user has had but too frequent occasion to lament, that the old road engineers seldom recognised that though the distance between two points might be the same, or nearly the same, over the top or round a hill, the expenditure of energy required by the alternative routes was vastly different. "But for the hills on our roads," says our contemporary, "the £100 car could be built to-morrow." It would follow that in flat districts like Holland, or the East of England, it might be worth while for manufacturers to specialise in the production of cheap cars for flat districts. Even as it is, however, there are excellent light cars for two passengers to be had at £150, and as the market for these increases there is little doubt that they will approximate more and more to the figure which appears to be the ideal of that rather mythical personage, "the man of moderate means." Many of them are excellent hill-climbers, too, though, of course, their owner must not mind being left on hills by high-powered cars costing ten times as much. In the automobile industry, as in every other, growth of demand and increase of market is bound to be followed by increasing cheapness.

M. SANTOS DUMONT, who has been appointed a Chevalier of the Legion of Honour, sailed last Saturday for America mainly with the object of superintending the arrangements for the installation of his airship at the St. Louis World's Fair. M. Dumont will take part in the great aeronautical contest being held there this year.

AMONG the multitudinous varieties of experimental aeroplanes, a small model machine by Mr. James Douglas, of Kalamazoo, Michigan, is said to have been successfully tried over the short distance of 30 metres without touching the ground. This, of course, is nothing in the way of a flight, but the machine is of interest as we believe it is the first model of an aeroplane which has been provided with a steam turbine for actuating its propeller.

THE battle about the sex of the automobile is again raging in France.

PANHARD'S American agents are threatened with action by the Association who are attempting to uphold the claims under the Selden Patent.

ENTRIES for the Turin International Automobile Exhibition, which will be held from February 6th to 21st, will close on January 19th. A special section for aeronautics has been determined upon, and a strong feature is to be made of this department.

THE use of automobiles is steadily increasing in Belgium. At the end of 1901, 2,046 were in use (714 motor bicycles); in 1902, 3,418 (1,427 motor bicycles). For the past year the numbers were 5,299 (2,671 motor bicycles).

THE Adam-Boudin spherical motor boat has arrived at the stage of experiment. The machine, which recently covered a distance of 400 metres on the water in 2 mins. 54 secs., is externally almost a perfect sphere. It consists of two concentric spheres of sheet steel of a thickness of 3 mm., arranged inside one another like a Chinese puzzle, the internal sphere carrying a 24-h.p. petrol motor, and the exterior sphere being outwardly provided with a number of paddle blades on either side of a ridge or keel, which completely surrounds its circumference. The diameter of the whole is 3 metres, and its displacement 3 tons. The 2-cylinder petrol motor of 24-h.p., which provides the motive power, has electrical ignition, with four speeds and a reverse. The mechanical arrangements are such as to cause the outer sphere to roll round the inner one when the motor is in action, and in this way the boat progresses. The passengers get inside it through lateral openings, and the exhaust pipe is also carried out laterally. M. Georges Hulin, of *L'Auto*, who witnessed the trials of the machine, thinks that they were absolutely satisfactory, though how the passengers are to see out of it, or what means are provided for seeing the direction taken, is at present unapparent.

LAST April we published certain particulars in regard to import duty leviable on motor vehicles in foreign countries and British possessions, as announced by the Board of Trade. The following further particulars are now available from the same source:—

Foreign Countries:
- Sweden, 15 per cent. ad valorem.
- Peru, free of import duty.
- Argentine Republic, 62 per cent. on the value as assessed by the Customs authorities.

British Possessions:
- India, 5 per cent. ad valorem.
- Ceylon, if not for traction purposes, 5½ per cent ad valorem. If for traction purposes, free of duty.
- Mauritius, 10·4 per cent. ad valorem.
- Falkland Islands, free importation.
- South African Customs Union (Cape Colony, Natal, Orange River Colony, Transvaal, Southern Rhodesia), 5 per cent. ad valorem, with a rebate of one-fourth of the duty leviable if the goods are of British manufacture, and accompanied by a certificate to that effect in due form.
- Canada. Automobiles are not specifically named, but come under the head of "carriages and vehicles," and pay 35 per cent. ad valorem, with a rebate of one-third off all British manufactures. Duty on automobiles, not new, in use by tourists coming temporarily to Canada, is refunded on re-exportation within a period not exceeding six months.
- Newfoundland, 30 per cent. ad valorem.

CORRESPONDENCE.

⁂ *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letter intended for insertion, or containing queries.*

THE ADVANTAGES ACCRUING TO HORSES FROM THE USE OF AUTOMOTORS.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—The Church Society for the Promotion of Kindness to Animals wishes to make known everywhere that the general use of automotors would be immeasurably to the advantage of horses. But its means are too small for it to do much. Will readers of THE AUTOMOTOR JOURNAL help?

F. LAWRENCE, Hon. Sec.

7, Park Mansions, South Lambeth Road, S.W.,
December 29, 1903.

Court of Bankruptcy.—Re A. E. Hodgson.—At the adjourned meeting, on the 4th instant, of the creditors held under this failure, Mr. W. S. Ogle, chartered accountant, was appointed to wind up the estate in bankruptcy.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Acme Engine Company (Limited), Acme Works, Budhill, Shettleston, Glasgow.—Capital, £12,000 in £1 shares. Object, to acquire the patents for improvements relating to gas or internal combustion engines, &c.

Alnwick Motor Garage and Cycle Company (Limited).—Capital £5,000 in £1 shares. First directors, T. Pringle and C. B. Ford.

Electric and General Assurance (Limited).—Capital, £10,000 in £1 shares. Object, to insure against loss or damage arising from electric or other tramway, light railway, omnibus, motor car, and similar accidents, &c. First directors, P. G. H. Carvill (chairman and managing director), J. H. Albright, J. Devonshire, and G. Cornwallis-West. A. W. Johanning is assistant manager and secretary.

James Ogilvie (Limited).—Capital, £1,500 in £1 shares. Object, to acquire the business carried on by J. Ogilvie, 128, Renfield Street, Glasgow, of factors and manufacturers of cycles and motors and accessories therefor.

Kidderminster Motor and Cycle Company (Limited), Mill Street, Kidderminster.—Capital, £5,000 in £1 shares. First directors, H. M. McAllister, T. W. Bowen, R. S. Brinton, D. S. Bowen, R. Woodward, A. S. Thursfield, and W. P. Yates.

Lacoste and Battmann (Limited).—Capital, £160,000 in £1 shares.—Object, to acquire the business of motor car manufacturers carried on at 16, Rue Chaptal, Levallois Perret, near Paris, by Messrs. Lacoste and Battman.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published January 7th, 1904.

25,304. W. C. PETERS AND C. BELLAMY. Pneumatic tyres.
27,370. P. N. LUCAS-GIRARDVILLE AND L. MEKARSKI. Combined internal combustion and compressed air motors.
27,381. E. H. BOUHEY AND R. A. LE GRAND. Transmission mechanism.
27,653. E. C. HAGEN. Lever transmission gear.
27,654. E. C. HAGEN. Mechanism for converting reciprocating into rotary motion.
27,655. E. C. HAGEN. Motor car mechanism.
27,656. E. C. HAGEN. Adjustable mechanism for lever transmission systems with variable stroke.
28,106. CIE. FRANCE DES NOUVELLES POMPES A AIR. Pumps for inflating pneumatic tyres.

Applied for in 1903.

Published January 7th, 1904.

442. J. W. HALL. Hydraulic variable transmission mechanism.
955. A. ROSE. Gear for motor cycles and motor cars.
1,733. W. B. BURCHALL. Internal combustion engines and steam engines.
1,808. H MOXON. Internal combustion engines.
2,152. A. HERZ. Electric spark-plug.
2,286. J. HOOD Controlling apparatus.
2,896. E. J. S. STARKEY AND J. RUMBALL. Sprags.
2,899. P. A. AND D. A. MARTIN. Elastic tyres for wheels.
18,768. M. BOURCART. Flying mechanism.
19,324. W. C. OWEN. Elevated platforms for repairing and cleaning
23,575. W. W. ADAMS. Transmission gear.

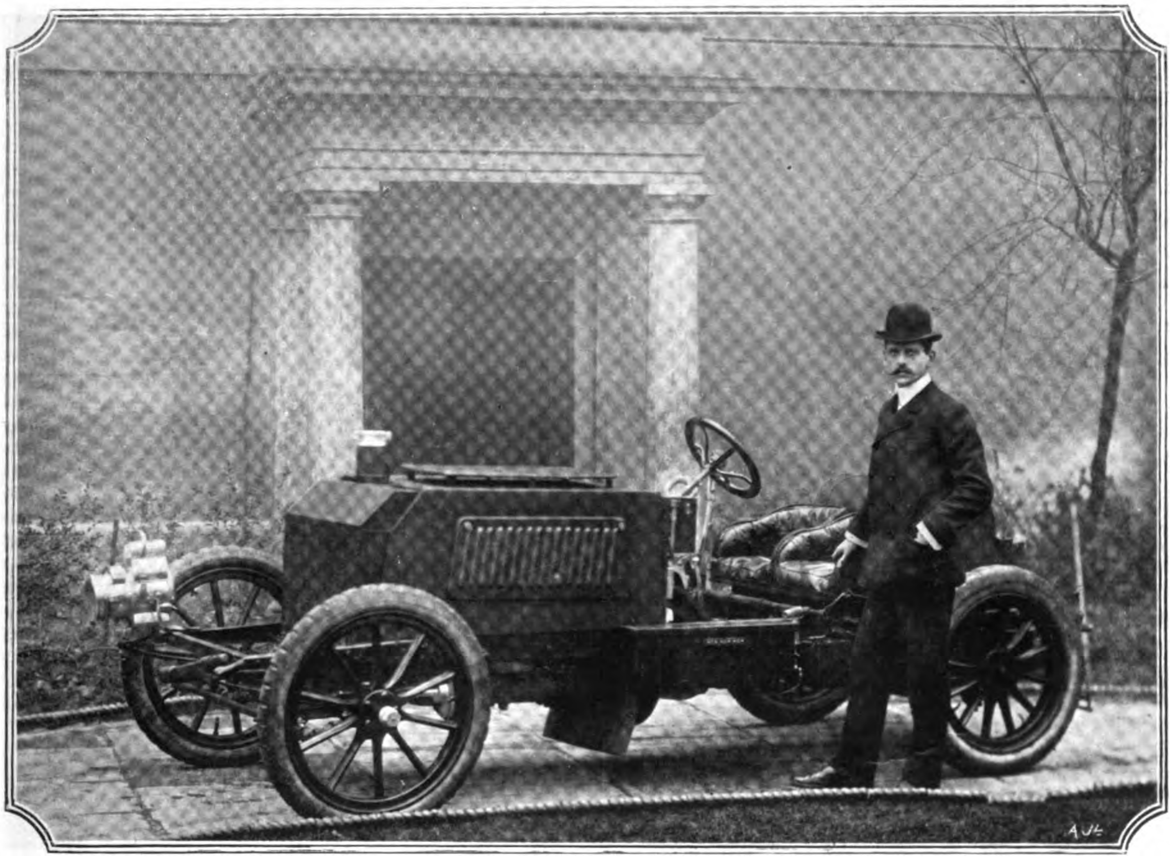
THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

No. 158. (No. 3, Vol. IX.)] JANUARY 16TH, 1904. [Registered at the G.P.O. as a Newspaper.] [Weekly, Price 3d. Post Free, 3½d.



Lieut.-Col. Mark Mayhew and his 100-h.p. Napier Racer, which he hopes to drive—as one of the selected representatives of Great Britain—in the Race for the Gordon-Bennett Cup in Germany this year; he will therefore take part in the Eliminating Trials which are to be held in connection with that event. (For description, see p. 71).

THE AUTOMOTOR JOURNAL.

Telephone No.—
1828 Gerrard.

Telegraphic Address—
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When any difficulty is experienced in procuring the Journal from local newsvendors, intending subscribers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Jan. 13 ...	"Motor Vehicles," by W. Norris (Liverpool Engineering Society).
*Jan. 14 ...	Smoking Concert (Automobile Club).
Jan. 15–23 ...	Leeds Cycle and Motor Show.
Jan. 18 ..	"Reminiscences of the Road," by Mr. C. Jarrott (Scottish A.C.).
*Jan. 21 ..	The Motor Car Act, by Earl Russell (A.C. Paper).
*Jan. 28 ...	"Railway Companies and the Motor Problem," by Mr. George Montagu, M.P. (A.C. Paper).
Feb. 1 ...	Final Entry Day for British International Cup
Feb. 1 ...	"Evolution of Road-making in Scotland," by Mr. R. Drummond, C.E. (Scottish A.C.).
Feb. 2–6 ...	Liverpool Cycle and Motor Show (St. George's Hall).
*Feb. 11 ...	"The British Automobile Industry," by Mr. T. C. Aveling (A. C. Paper).
Feb. 12–24 ...	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
*Feb. 12 ...	Quarterly 100 Miles Trial.
Feb. 23–27 ...	Hull Cycle and Motor Show (Assembly Rooms).
Mar. 4 ...	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
Mar. 25–30 ...	*Side-Slip Trials.
April or May...	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

* Automobile Club of Great Britain and Ireland Events.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Jan. 16–23 ..	Madison Square (New York) Show.
Jan. 23–Feb. 4	Brussels Automobile Salon.
Jan. 25–30 ...	Ormond-Daytona Races (Florida).
Jan. 26–30 ...	Philadelphia Show.
Feb.	Tourist Run and Consumption Trial (*L'Auto*).
Feb. 3–6 ...	Paris-Turin Tourist Run (*France Automobile*).
Feb. 6–13 ...	Chicago Show.
Feb. 6–21 ...	Turin Exhibition.
Feb. 14 ...	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Feb. 15–20 ...	Detroit Show.
Feb. 23–27 ...	Anti-Skid Trials at Versailles.
Feb. 29–Mar. 5	Cleveland Show.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 6–12 ...	Buffalo Show.
Mar. 13–20 ...	Cannes Automobile Week.
Mar. 14–19 ...	Boston Show.
Mar. 15–16 ...	A.C. America Commercial Vehicle Trials.
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Mar. 23–27 ...	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 .	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Nice-Rome.
May	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 1–12 ...	A.C. Bordelais Automobile Fortnight.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif.*
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June 7 ...	Namur Week.
June 7 ...	Spa Week.
June 17 ...	Gordon-Bennett Race.
July	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 23–25 ...	Lucerne Motor Boat Races.
Aug. 5–11 .	Paris-Deauville Motor Boat Race.
Aug. 12	Motor Boat Race for Gaston Menier Cup.
Aug. 15 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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PASSING EVENTS.

"Society of Encouragement" or Amateur Trading Corporation ? ? ?

SINCE "Notes and Notices" was converted into the *Automobile Club Journal*, we have from time to time expressed our disapproval both of that organ itself, of the manner in which it is being conducted, and of what we consider the decidedly mistaken policy of which it is the unattractive offspring. Our views on this policy, and on the impropriety of conducting a club publication as a trade journal, are not only shared by the whole of the automobile Press, but are, we believe, held by most members of the automobile community. We have expressed these views freely during the past few months, because by doing so we had hoped that the members both of the Club Committee and of the Sub-Committee that was appointed to enquire into and report on the club *Journal* question would see the wisdom of altering this policy in the future. That hope we must, for the present, at any rate, abandon. The Sub-Committee appointed on the club *Journal* question has reported to the General Committee of the club in favour of continuing the *Journal* on its present lines, and the Club Committee has decided to accept the report of the Sub-Committee. Thus the Club Committee may be regarded as having nailed its colours to the mast, as far as the *Journal* and the policy (if it can be called a policy) which animates its utterances are concerned.

We do not for a moment believe that in adopting this attitude the Club Committee are really acting as the exponents of the general wishes of the majority of the members of the club. We have the best of reasons for believing that the non-official members of the club may be divided into those who have not troubled about the question of the *Journal* at all, who probably never read it, and on its arrival consign it to the waste-paper basket, and those who understand the question and are opposed to a policy which, without their consent and over their heads, has made them partners in a trading concern. Those who approve of, and are responsible for, the policy of continuing the *Journal* are, we believe, a small minority. Some of them are gentlemen who have a considerable amount of spare time on their hands, are anxious to arrange a pastime for themselves, are glad to provide an outlet for their energies, and are therefore just the very men whose honorary services might be valuable to any "Society of Encouragement." But that people in this position are either fitted for, or should be permitted to have, the control of a trade paper—or of any other commercial venture—is open to the gravest doubt. They have the funds of a powerful organisation behind them, and can consequently continue complacently to carry the *Journal* on at a loss, without worry or pecuniary sacrifices to themselves. That they should frequently yield to the temptation to air their own crochets, and that the tendency should be to develop a mutual admiration society, is one of the dangers in such a situation. The crux of the matter is, however, that as soon as a "Society of Encouragement" becomes a "trading corporation" its entire prestige inevitably disappears, for not only must it lose the support of all distinguished members, but its proper functions will be sadly neglected, while its reputation for impartiality in trials, non-stop runs, and all other events of the kind cannot fail to be seriously impaired.

Encouragement (?) and the Trade.

THE effect that the present policy of the Club is already having on the future of the automobile movement is serious to a degree. It will provoke, and is already provoking, the intense hostility of the trade, to say nothing of that of a number of public men who have a kindly feeling towards the industry. To all interested in the welfare of the automobile movement, the influence, dignity, and success of whatever body represents the industry nationally cannot be a matter of indifference. But no such body can continue to represent the industry effectively that does not command the cordial support and hearty co-operation of the trade as a whole. A ministry attempting to carry on the government of the country, with the majority of Parliament in opposition, would not be in a worse position. And the chief danger to the future position and the influence of the A.C.G.B.I.—and in consequence a serious menance to the prosperity of the automobile movement—is to be found in the fact that the policy of carrying on the club *Journal* is ranging the trade solidly against the club. For it is the trade that is finding the funds for conducting the *Journal*, and doubtless it would find the same amount willingly enough if it were used for benefitting the industry. The trade is finding the money because it is making what is in effect and what it also feels to be a "forced contribution" to the expenses of running that publication, of which no part is used in any real sense for purposes of "encouragement." It is a "forced contribution" because the amounts paid are for advertisements which are not of real value.

It is commonly recognised that advertisements in journals, the circulation of which is largely complimentary or gratuitous, are practically of only the smallest value. And this is what the circulation of the club *Journal* to all intents and purposes is. The sales of the club *Journal*, apart from its free distribution, brought in in the ten months January to October, £24 3*s*., *i.e*., under 1,000 copies were *sold* during that period, or about an average of 25 copies per week. Few even of this small number have been, we believe, *bonâ fide* sales to the public, but have been largely purchased for private distribution in batches, for the sake of some laudatory or flattering article. Why, then, have the trade supported the club *Journal* to the extent they have done? We learn from a passage in the recent report, which, by the way, acknowledges the impropriety of canvassing for advertisements, and proposes that it should in future be abandoned, that they have hitherto been obtained through canvassing done by members of the club staff. What is the position of a manufacturer who is canvassed for an advertisement in the club *Journal*? In the majority of cases he gives the advertisement, not because he thinks it is worth the money, but because he, not unnaturally, fears that if he refused it he might incur the hostility of a powerful organisation, or at any rate of some of its leading members. It is this feeling which is rendering the whole policy so unpopular with the trade, and is making the trade as a whole inimical to the club as a body. That the Sub-Committee feel this is clearly shown by their laying down, as we have mentioned, that some scheme should be evolved by which this canvassing can be avoided. A condition of affairs which thus tends to promote and foster a feeling of hostility towards the club, on the part of the trade, is, we repeat, certain to have a prejudicial effect upon the future of the automobile movement.

The Journal. Cost *v.* Value.

NOR must it be imagined that these forced contributions are trifling. They are even at present exacted at the rate of upwards of £6,000 a year, and, if the trade permits them to continue, it will find the club *Journal* a veritable Old Man of the Sea. The stronger it grows the greater will be its strength to extort further exactions. If the position is such that the trade has felt compelled to yield to the tune of £6,000 per annum to the comparatively feeble pressure that it can now bring to bear when it only incurs a loss, what will be the position if it should succeed in making a considerable profit. At present it causes a loss of £137 15*s.* 5*d.* It has been attempted to disguise this fact in the editorial columns of the *Journal*, by representing this loss as practically a gain. The argument adopted is ingenious. It is said that if the *Journal* were not conducted as a trade paper it would cost £395 6*s.* 7*d.* alone for postage to the members, but as it only costs the club the smaller sum of £137 15*s.* 5*d.*, they are therefore getting it for a third of the postage cost. In any case there is a refreshing audacity in "squeezing" the trade to the extent of £5,088 to save £257 11*s.* 2*d.* in postage to members of the club. But this assumes that a journal of this kind is a necessity. The contention is, of course, a pure sophistry. A real club paper, such as existed before the change of policy and as published by other institutions of a similar kind, and confined to the publication and dissemination of strictly club news and information, appearing once or twice a month, is the most that is needed for conveying private intelligence to the members, because most notices of any urgency could easily be inserted in the ordinary automobile press. In fact, this would be much better for the club, because its doings and deliberations would then be more fully dealt with in the general and the automobile press, and in that way obtain much wider publicity than they do at present in a journal which has had practically no public circulation, and is in future to have none at all.

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A Pleasant Prospect!—for the Trade.

IF the trade consider its own true interests it will put its foot down firmly in this matter. For it is evidently intended to carry this principle of enforced contributions a great deal further. A member of the *Journal* Committee—and one whose name now appears on the Publication Committee—has openly boasted that in a few years' time there will only be one journal—the Club *Journal;* that, when that is the case, advertisements in its pages will be of such value that the Trade will probably have to assemble and bid against each other at auction to secure advertisement space in its pages. This is, of course, a ludicrous exaggeration of anything that can possibly be effected, but it shows that those responsible for the policy have the distinct intention of using the club influence and the club position in an attempt to build up a property the value of which will depend on the exactions which, having the club behind it, it will be enabled to make. It is a distinct attempt to corner the Trade, and if the Trade does not mean to be cornered, it must put its foot down hard—and *now.*

All that the trade is now contributing to the Club *Journal*, by payment for advertisements, is actually tending to assist in building up a threatening monopoly of this kind. The stronger the *Journal* grows the more difficult it will be to prevent its further growth, and the more difficult it will be to combat it. It is, therefore, now and at once that the trade must decide whether it will any longer tolerate a "Society of Encouragement" misusing its position in this manner. The trade can stop the mischief at once by a combined and decided attitude. If it neglects to do so now it may find such action beyond its power in the future.

There is no reason why the Club should confine its trading merely to running a trade paper. Several attempts have been made in the past to commence a business in accessories, &c. They have, so far, been promptly stopped. If the *Journal* is permitted to go on on its present lines, there is, however, no reason why these attempts should not be renewed, and extended possibly to trading in cars, the whole movement being backed up by the club *Journal.* The *Journal* is the first attempt at general trading, and the Trade would be well advised to stop it, and to stop it quickly.

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For the Club's Own Sake.

NOR is this the only important aspect of the question. Until comparatively recently the Club occupied a unique position. It commanded the respect of the public generally, the confidence of all automobilists, the support of the trade, and the friendly consideration of the Government and of all local authorities. Every one of these advantages it has either wholly or partly sacrificed since the change of policy which has taken effect in the conversion of *Notes and Notices* into the *Automobile Club Journal.* This is to some extent due to the regrettable absence of tact, judgment, and capability with which that *Journal* itself has been conducted, and to which we have, from time to time, in the public interest, felt called upon to draw attention. *But it is inherent in the situation.* In running a trade journal for profit (correctly speaking for present loss which it is hoped to convert into profit), the Club is becoming a trade corporation just as much as if it manufactured a special car or a special carburettor, and put them on the market as the Club car or the Club carburettor. Neither Governments, local authorities, nor the public can look on such a corporation in the same way as they formerly looked upon the Club, as consisting mainly of men of position interested in a new movement, doing all they could to promote it, both as an industry and as a sport, often at the cost of considerable self sacrifice and in every way standing as a Society of Encouragement upon the same platform as the Automobile Clubs of France and Germany. The truth of these observations is illustrated with painful clearness by the conspicuous manner in which, when framing its regulations under the new Act, the Local Government Board preferred to confer with a special Committee called together by the Hon. J. Scott Montagu, and with other interested bodies, rather than have any dealings whatever with the Automobile Club. These facts speak for themselves, and form the most powerful commentary and condemnation of the policy of which we have repeatedly felt called upon to disapprove. At its commencement the Automobile Club pre-eminently assumed the *rôle* of a Society of Encouragement — an institution whose principal *raison d'être* was to assist and benefit the automobile movement in every possible way. By running the club *Journal* it has, as we have shown, prejudiced its position in the eyes of the public and the responsible authorities of the country, and as far as the *Journal* itself is concerned, the Club is not contributing to the benefit of the industry, but is exploiting the trade to provide funds for entirely imaginary needs of its own.

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An Important Legislative Delay.

IN a letter which we publish in our correspondence columns Dr. Brightmore draws attention to the very unsatisfactory condition of affairs which the muddled and hurried Motor Car Act of 1903 has permitted to obtain in regard to heavy traction. Section 20 of the Act of 1903 states that the term "motor car" in this Act has the same meaning as "light locomotive" in the Act of 1896. When we turn to the latter Act we find in Section 1 that the enactments in the Schedule to the Act "shall not apply to any vehicle propelled by mechanical power if it is under 3 tons in weight." Consequently, if a motor vehicle weighs 3 tons or more, it is to all intents and purposes, as Dr. Brightmore points out, a traction-engine, and the registering authorities are justified in refusing to register it as a motor car. Being a traction-engine, it cannot go more than four miles an hour, and must have at least two men in charge of it. Now many lurries in the country weigh over 3 tons; in fact they cannot be well and substantially built without weighing in most cases a good deal more. It is true that they have hitherto been permitted to run as weighing under 3 tons, and it is for this reason that we occasionally see steam and other lurries embellished with a large and legible inscription setting forth that they weigh 2 tons 19 cwt., and generally some quarters—even if they weigh this, and more. But things are different now that they have to be registered, and of course manufacturers do not like adopting the course of registering lurries at what they well know is less than their real weight. The situation is serious, for the heavy lurry industry is being seriously interfered with by this legislative muddle. The Local Government Board have promised to go into this question repeatedly.

The Act of 1903 gives them full power to do so. Dr. Brightmore urges that the tare weight should not be less than 7 tons, or, say, a gross load of 16 tons. For goodness sake let the Local Government Board urge the Departmental Committee they have appointed to go into this matter, to come to a decision at the earliest possible moment. A most promising branch of automobilism, and the one which English engineers have made peculiarly their own, is the manufacture of the commercial vehicle. That is now largely at a standstill. It cannot revive till the Local Government Board take action. This surely is a matter of urgency if ever there were one.

With men of such practical experience and administrative capacity serving on the Committee as the Hon. Arthur Stanley, M.P., Sir John Thornycroft, F.R.S., Major Lindsay-Lloyd, R.E., to whom have recently been added, to represent more directly the trade, Mr. Burford and Mr. S. Straker, there is no doubt that sensible and useful regulations will be drawn up. The important point is that they should be formulated at the earliest possible moment.

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Misapprehension in High Places.

WE wish someone would inform us how the mistaken notion, that a lower limit than 10 miles an hour can be legally prescribed, arose. Is it an invention of the daily papers which they have repeated so often that people have come to believe it? At any rate the annoying misunderstanding continues to be insisted upon and to spread. The County Councils' Association and the Municipal Corporations' Association recently held a conference at Westminster, which was attended by Mr. H. C. Monro, C.B., on behalf of the Local Government Board, and Mr. J. N. Dobbs for the Scottish Office. The object of the meeting was to suggest uniformity in the designs adopted for the notice boards in various parts of the country on roads where the 10-mile limit is to be adopted, and on those which are prohibited altogether. In addition, the conference discussed the question of certain designs of notice boards to show dangerous corners, cross roads, and sudden dips. It is at present suggested, and the suggestion will probably be adopted, that for the 10 miles an hour limit a round white ring 18 inches in diameter shall be used with a plate below, giving the limit in figures. A solid red disc of the same diameter is to be used for total prohibition, while a hollow green equilateral triangle is to be used as a danger signal. All other notices under the Act are to be on diamond-shaped boards. During the discussion, it was stated that a lower limit than 10 miles an hour could be legally adopted under Section 8 of the Act. There is certainly no power to do so under Section 9, which is the section designed for regulating the rate of speed. If an attempt is being made to twist the phraseology of Section 8 (drafted for a totally different purpose) in order to enable speed to be still further restricted, it is of importance that every automobilist in the country, and particularly those who are to be looked upon as the guardians of the interests of the movement, should keep a look out. Section 8 states that the Local Government Board may by regulations made under Section 6 of the principal Act (that is the Act of 1896) prohibit or restrict the driving of any special kind of motor cars on any specified highway or part of a highway which does not exceed 16 feet in width, or on which ordinary motor traffic would in their opinion be specially dangerous. The clear meaning of the word "restrict," taking the context of this section into consideration, would obviously refer to regulations stating that, say, not more than so many cars may pass along the particular road at once, but considering that there were other sections specially referring to the rate of speed, it would be nothing short of monstrous to allow the phraseology of this section to be perverted in such a manner. We feel quite certain that the Local Government Board will not permit anything of the kind to be done.

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The General Committee of the Motor Union.

THE first meeting of the General Committee of the Motor Union was held on Monday, the 11th inst., at 4.30 p.m. at the Automobile Club. The representatives of the affiliated provincial clubs who have seats on this Committee met in solemn conclave on this occasion for the first time. Various matters of general interest were discussed, and among other decisions taken, a resolution to provide £50 towards the expenses of prosecuting a certain well-known Metropolitan policeman for alleged perjury was duly carried. We are glad to see the new year commenced by such a step in the right direction as this.

THE 1904 COTTEREAU PETROL CARS.

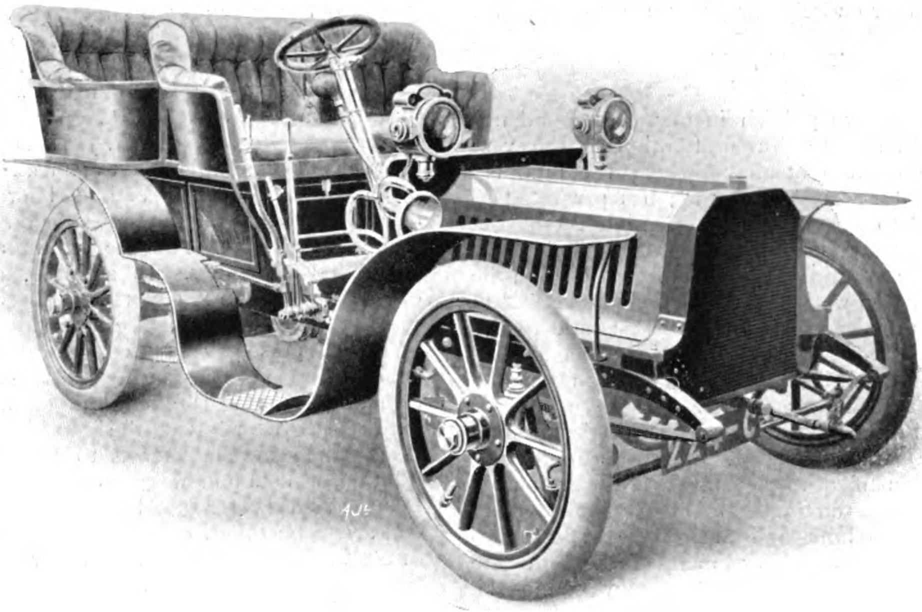


FIG. 1.—The 3-Cylinder Cottereau Petrol Car.

THE most interesting departure made by the enterprising firm of Cottereau and Co., of Dijon, is the introduction this year of a 3-cylinder 12 to 16-h.p. vehicle, which is not only constructed on thoroughly up-to-date lines, but differs in many important respects from their other well-known models. A chassis of this type formed the chief attraction on their stall at the recent Paris Salon, and a complete vehicle of the same pattern was available in the neighbourhood of the Exhibition for demonstrating the good points of the new model to customers. We took advantage of the opportunity thus offered of giving it a practical trial, and were impressed with its comfort, silence, and absence of vibration. It is apparently in all respects equal to many good 4-cylinder vehicles, and it has plenty of power as an all-round touring vehicle for four passengers.

A good general idea of this model, which it will be observed is of the side-chain type, can be obtained from the accompanying illustrations, Figs. 1 to 3, and the more important portions of it are shown in the further illustrations, Figs. 4 to 10 inclusive. Fig. 1 is reproduced from a photograph of the complete car, which is fitted with a well-made and nicely finished tonneau body of the usual form. Fig. 2 is a view of the complete chassis from above, in which the positions of the various portions of the mechanism are well seen, and in Fig. 3 the central part of the chassis, as seen from the left side—is well indicated, the gear-box, the regulating levers and pedals, and the fittings on the dash being particularly prominent.

The main frame is constructed of pressed steel, and is formed with a substantial underframe, which supports the engine and the gear-box. The underframe is rendered rigid with the frame proper by strong pressed steel brackets, connecting these two parts together at intervals. The frame is carried upon long flat semi-elliptic side springs in much the usual way, and those above the back axle are placed outside the frame itself, with shackles at each end. The back axle is tubular and the front axle is a solid forging. The former is straight and is connected with the frame by the usual adjustable radius rods, whilst the latter bows downwards beneath the engine and is bifurcated at its ends to support the steering heads both above and below. Substantial wheels of the artillery type are employed, and these run on ball-bearings; the wheels are made in two standard sizes, to take 810 by 90 mm. tyres, or 870 by 90 mm., at the option of the purchaser; the chassis in the Salon had Collier tyres. The wheel base is 7 ft. 8 in., the track 4 ft. 4 in., and the weight of the chassis is about 15 cwt. The steering gear is of the irreversible type, with sloping steering pillar; it is specially arranged so as to prevent vibration or shocks from being transmitted to the driver's hand.

The appearance of the engine, removed from the chassis, is seen in Fig. 4, which is reproduced from a photograph taken from the left-hand side. It is seen from the other side, fixed in place on the car, in Fig. 5, and is further shown by two vertical sections in Figs. 6 and 7 transversely and longitudinally respectively. Each of the three cylinders is formed by a separate casting, which is bolted to the upper portion of the aluminium crank-chamber. The cylinders have a bore of 95 mm., and the stroke is 120 mm.; at the normal speed of 1,200 revs. per min. the engine develops 16-b.h.p., and in practice it is capable of doing useful work when running at as low a speed as 150 r.p.m. The inlet-valve chambers are formed on the right side, and the exhaust-valve chambers on the left. All six valves are interchangeable, and have inspection covers screwed into the casting above them. The covers above the inlet-valves receive the ignition-plugs, which are of the ordinary high-tension pattern, and are used in conjunction with accumulators and induction coils. The upper portion of the cylinders have large water-jackets, as seen in Figs. 6 and 7, and have half compression cocks fitted centrally above

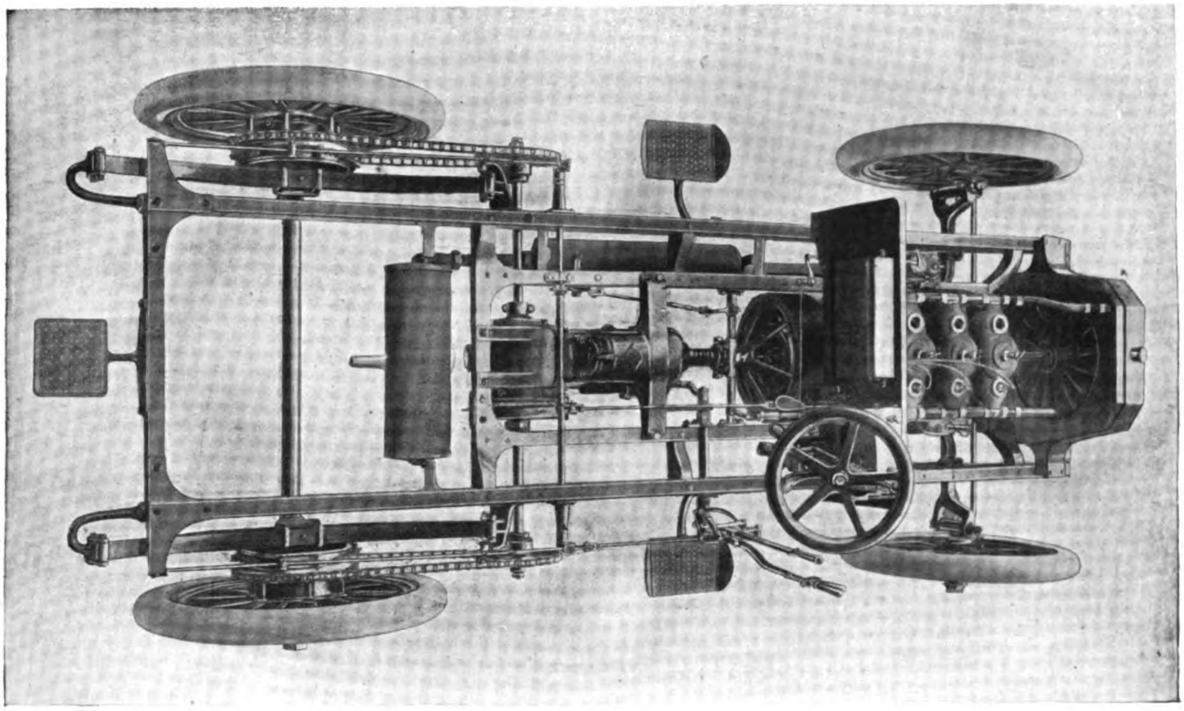


FIG. 2.—View of the 3-Cylinder Cottereau Chassis from above.

the cylinders. The water is led into each jacket around the inlet-valve chambers, and is led out at the opposite side near the exhaust-valve chambers. The crank-chamber is made in two pieces with a horizontal joint on the centre line of the crank-shaft; between these it forms three separate compartments, each of which has a large inspection cover at its lowest point. A separate bearing is thus provided between each of the cranks, which are set at an angle of 120 degrees from one another. The valves are so timed that the explosions occur at equal intervals in the cylinders, giving an explosion at each two-thirds of a revolution, as clearly shown in the accompanying diagram (Fig. 8), which will be easily understood.

The upper portion of the crank-chamber is so constructed that the cam-shafts on either side can be slid into place from the front end, together with the brasses

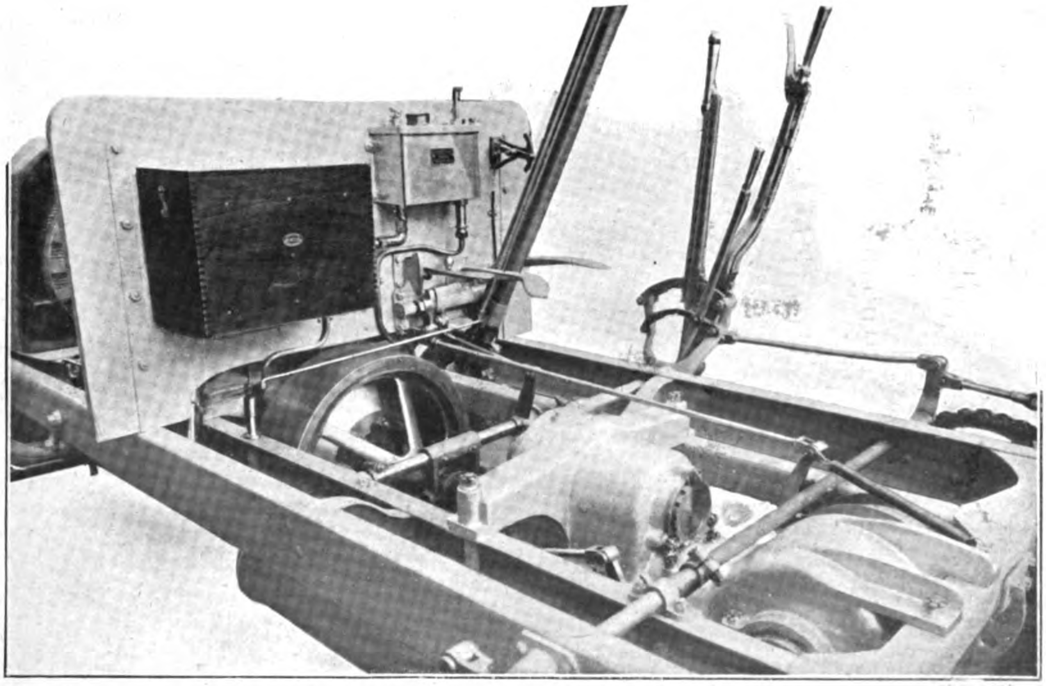


FIG. 3.—Central Portion of the 3-Cylinder Cottereau Chassis from the left side, showing Gear-box, Levers, Pedals, and Fittings on the Dash.

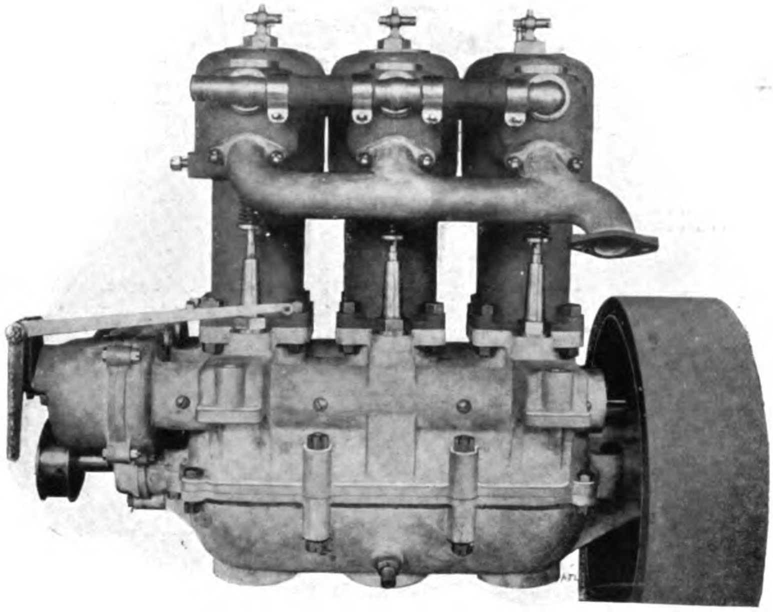


FIG. 4.—The 3-Cylinder Cottereau Engine, from the left side.

which form bearings for them between the cams. The brasses themselves are held in place by small set-screws passing through the outer wall of the casting, and are slightly larger than the cams. Each of these shafts has a gear-wheel at its forward end which meshes with a wheel on a central intermediate shaft, geared in the ratio of two to one to a wheel on the crank-shaft. All these four wheels are enclosed in a separate casing forming the front of the crank-chamber, and the casing also encloses the centrifugal governor on the front end of the exhaust cam-shaft. The intermediate shaft projects forward through the casing, and is coupled flexibly, though direct, with a circulating pump fixed to the frame. The front end of the crank-shaft carries a pulley, from which the fan behind the honeycomb radiator is driven by a belt, and the commutator is mounted on the front end of the inlet-cam-shaft.

All the valves are operated through push-rods in much the usual way, but, as can be seen in Fig. 6, the lower ends of these rods have additional pin-guides to steady

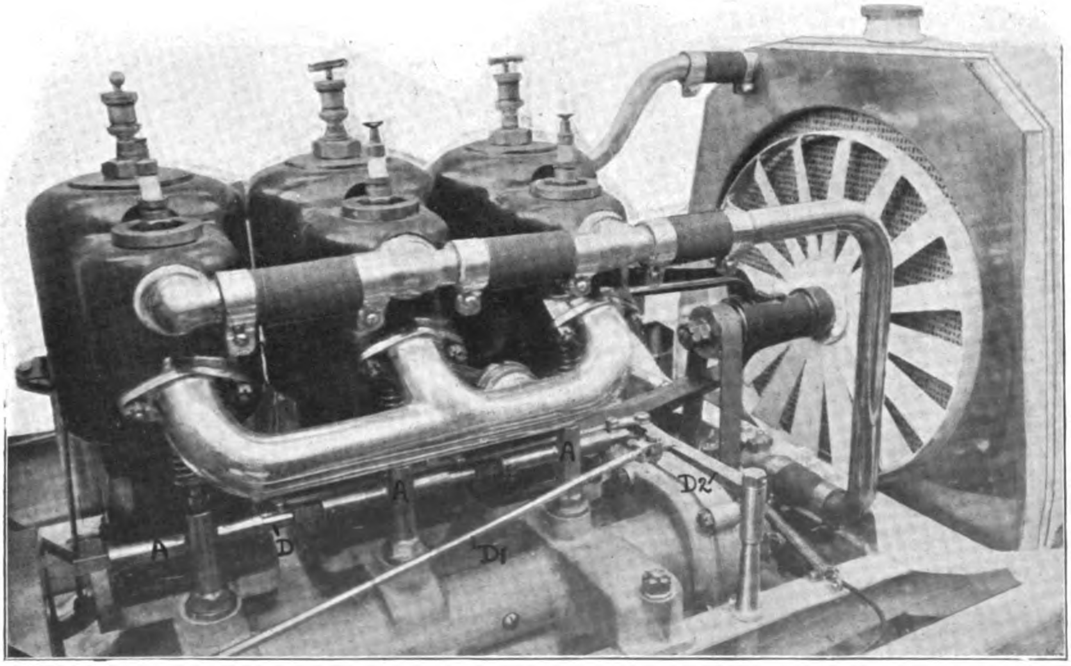


FIG. 5.—The 3-Cylinder Cottereau Engine, fixed in place in the Chassis—from the right side.

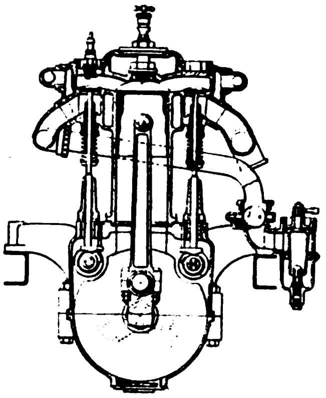


FIG. 6.—Transverse Vertical Section of the 3-Cylinder Cottereau Engine.

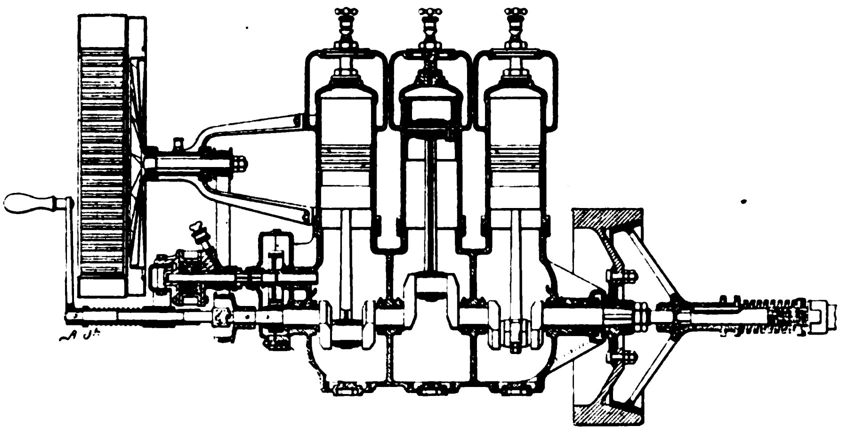


FIG. 7.—Longitudinal Vertical Section of the 3-Cylinder Cottereau Engine.

them. The push-rods for the inlet valves are constructed so that their effective length can be varied from a hand-lever mounted on the steering-pillar. Their construction for this purpose is clearly shown in Fig. 9, which not only shows one of these rods complete in its guide-casting, A, but also shows this mechanism taken apart entirely. The upper portion, B, of the push-rod has a screw-thread at its lower end and has long pinion teeth cut around its middle portion. The lower part, C, of the push-rod is drilled and tapped out for the upper part, B, to screw into, and the head at its lower end is shaped to ride on the cam. This head is also steadied by the guide-pin, C, that passes through it, the pin itself projecting downward from the crank-chamber casting. The rod, D, forms a toothed rack which is free to slide lengthwise in the horizontal guide formed for it in the casting, A, and its teeth engage in those in the rack B. The entire push-rod is therefore free to reciprocate—and thus allow the cam to lift the valve—but the portion, B, can at the same time be rotated about its axis by sliding the rack, D, longitudinally. The rod, B, can therefore be screwed further into or more out of the lower portion, C, of the push-rod, thus allowing any desired amount of back-lash to exist between the cam and the valve, causing the valve to open early or later, to open to a greater or less extent, and to close later or earlier; the quantity of mixture drawn into the cylinder during the suction strokes can thus be varied by the driver. The sliding rods, D, are all three connected together, as seen in Fig. 5, and are simultaneously moved by the rod, D^1, which is connected with them through the pivoted lever, D^2.

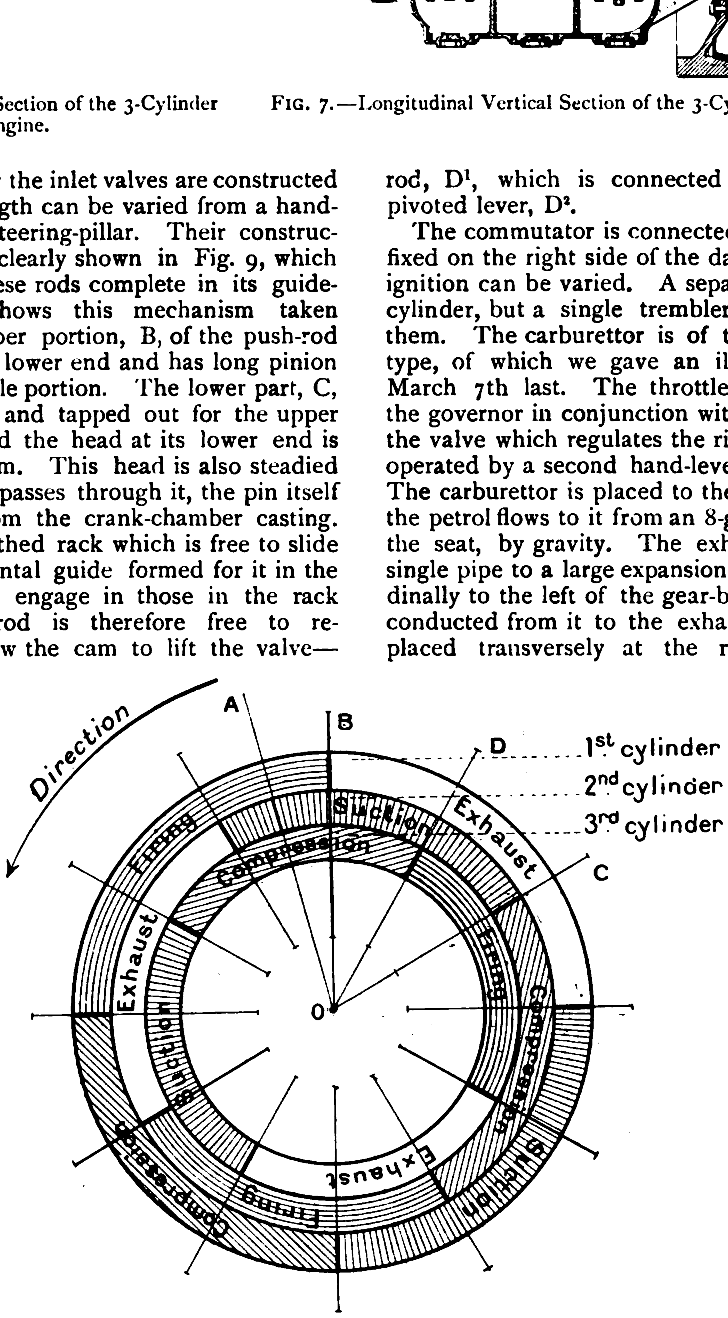


FIG. 8.—Diagram showing cycle of operations in each of the three Cylinders in relation to the half-speed Cam-Shaft—each circle represents two revolutions of the Engine.

The commutator is connected with a small hand-lever fixed on the right side of the dash, by which the time of ignition can be varied. A separate coil is used for each cylinder, but a single trembler serves for all three of them. The carburettor is of the same float-feed-spray type, of which we gave an illustrated description on March 7th last. The throttle-valve is connected with the governor in conjunction with an accelator pedal, and the valve which regulates the richness of the mixture is operated by a second hand-lever on the steering pillar. The carburettor is placed to the left of the engine, and the petrol flows to it from an 8-gall. tank, placed beneath the seat, by gravity. The exhaust gases are led by a single pipe to a large expansion chamber, placed longitudinally to the left of the gear-box, and are subsequently conducted from it to the exhaust-box proper, which is placed transversely at the rear. The honeycomb-radiator has a capacity of about 3 gals., and the fan, which draws the air through it, is mounted in ball bearings.

The main clutch is of the ordinary cone type, and is connected with the change-speed-gear by a shaft having flexible couplings. The entire transmission gear runs on ball bearings, which are of the adjustable type. The gear-box is rigidly fixed to the frame, and is of that type in which three speeds and a reverse are available, with a direct-through-drive to the differential counter-shaft on the top speed. A view of the box from beneath, with the bottom cover removed, is given in Fig. 10—in

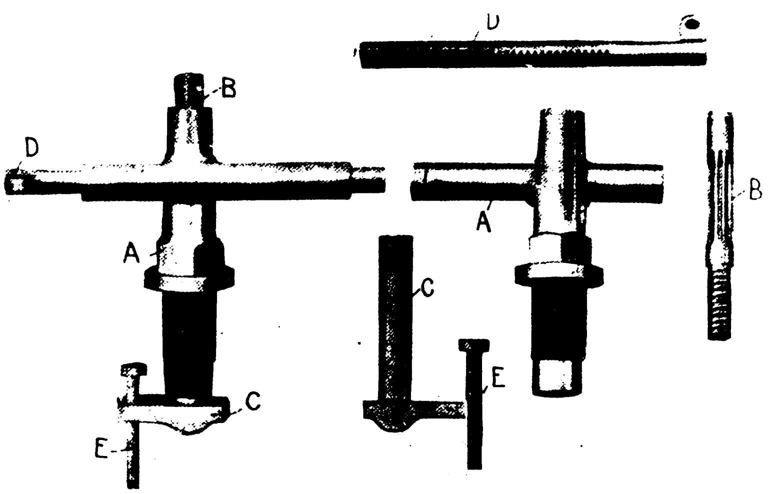


FIG. 9.—The Variable-Lift Inlet-Valve Mechanism on the 3-Cylinder and Single-Cylinder 1904 Cottereau Engines, showing one of the Push-Rods complete in its Guide, and the same parts disconnected and separate.

referring to this it must be remembered that the box is apparently upside down. The first-motion-shaft, F, has a square section inside the box, the spur-wheels, F, sliding upon it, for giving either of the three forward speeds. The shaft takes a bearing inside the gear-wheel, G, which is rigid with the bevel-wheel, G^1, and this wheel, G, has jaw-clutch members formed in it to correspond with those on the rear end of the sliding wheel-sleeve. Three spur-wheels, H^1, are fixed on the lay-shaft, H, one of them being at all times in mesh with the wheel, G, and the other two being so placed that the wheels, F^1, can be brought into gear with them. A separate hand-lever beside the driver is used for introducing the "reverse," this being connected with the intermediate wheel, J, causing it to come into mesh with the low-speed wheels on the shafts, F and H. The bevel-wheel, G^1, meshes with a larger bevel fixed to the shell of the differential-gear, K, and the brake drum, K^1, is also fixed to this shell. The two differential shafts terminate in flexible coupling members, L, with which engage the two halves of the countershaft carrying the sprockets. The countershaft brake is acted upon by metal shoes, and is operated by a foot-pedal as usual. The side brakes, too, are of the metal-to-metal external band type, and are simultaneously actuated by the side lever.

The engine is fed with oil from an automatic lubricator on the dash, and the gear-box, which is partly filled with oil, lubricates itself.

The other Cottereau models for this year consist of their "Populaire" voiturette, which is now supplied either as a two-seated vehicle or with a tonneau for four, of 7-h.p. and 10-h.p. twin-cylinder vehicles, and of a 4-cylinder 16 to 20-h.p. car. The engine on the Populaire is now of increased power, the cylinder having a bore of 105 mm., and the stroke being 118 mm. Its nominal power is 7 to 8-h.p., and the normal speed is 1,100 revs. per min. This handy little vehicle was illustrated and described by us on October 3rd and 10th last, and is unaltered in general respects this year. The engine, however, has the variable-lift inlet-valve device, described above, and the live axle is fitted with ball bearings. The chassis has its wheel base increased by eight inches when intended for use as a four-seater.

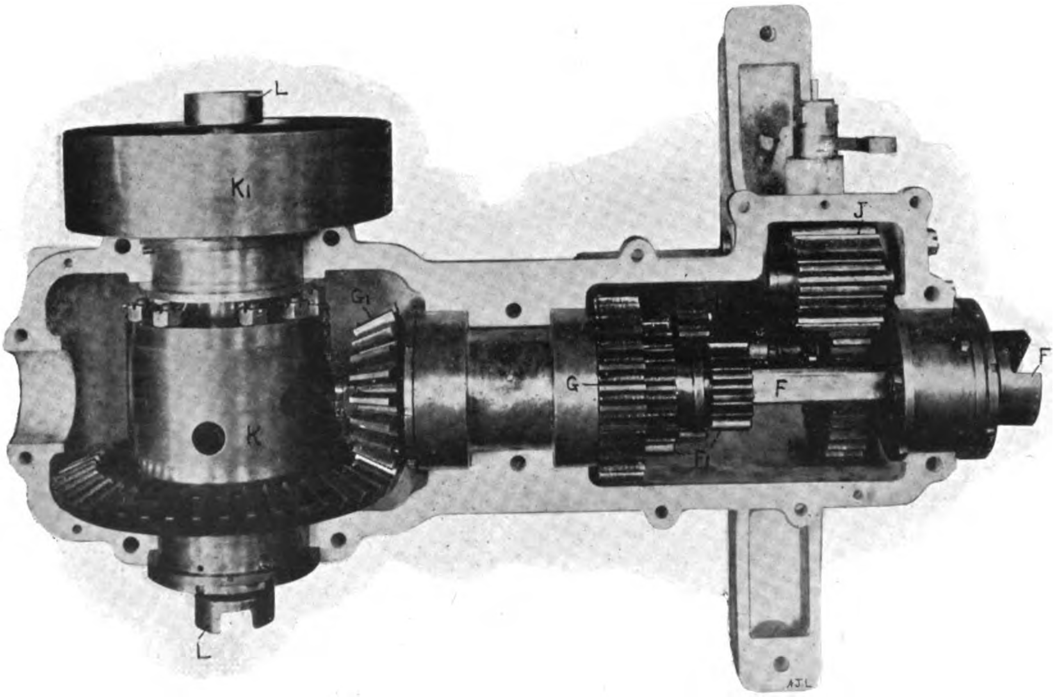
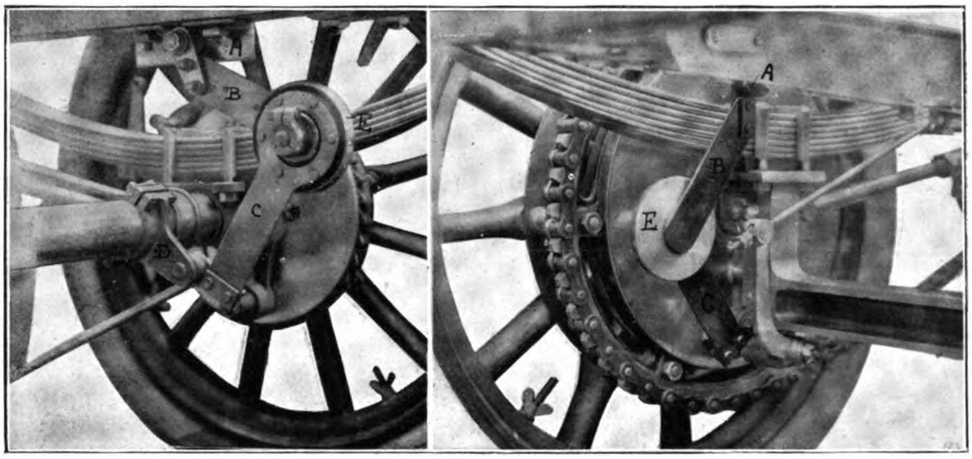


FIG. 10.—View of the Change-Speed-Gear on the 3-Cylinder Cottereau Car—taken from beneath, with the Bottom Cover removed.

The 7-h.p. car has cylinders 85 mm. by 105 mm., and those on the 10-h.p. vehicle have a larger bore—by 5 mm.; the respective normal speeds of these two engines is 1,200 and 1,300 revs. per min. A very full description of the 16 to 20-h.p. model appeared in our issue of March 7th last. This car has four forward speeds instead of three, as in the other models, and its cylinder dimensions are 92 mm. by 120 mm., the normal speed being 1,000 revs. per min. The change-speed-gear is similar to that on the Mors cars, a separate bevel gear being used between each of the gear shafts and the differential. The engine has high-tension and low-tension ignition, but the lift of the mechanically-operated inlet-valves is not variable. The sample chassis of this type, which was shown in the Paris Salon, was illustrated by us on December 19th last, p. 1359. The 1904 Cottereau models, which are well and strongly designed, show that the manufacturers are determined to keep in the front ranks amongst automobile manufacturers. They are in particular to be congratulated upon the new 3-cylinder car which they have so successfully produced. It will be remembered that Messrs. McNeil, Hutchison, and Borthwick, of 4, St. Mary's Parsonage, Manchester, are their sole and exclusive agents for the whole of the British Empire, and are the owners of the Cottereau patents over that area.

THE PEUGEOT SHOCK-DAMPER.



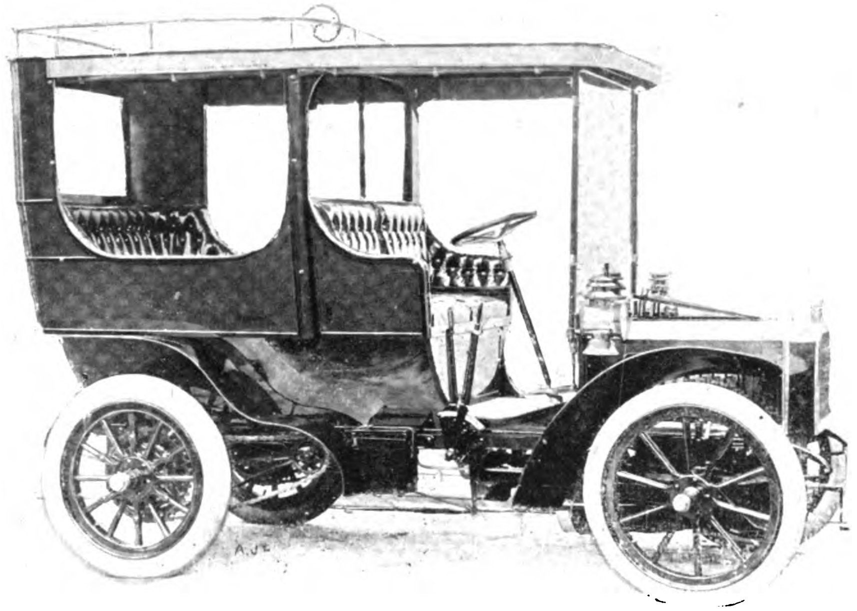
We are now able to give illustrations of the device fitted by the Peugeot Company, on some of their cars, to prevent the side-springs from having excessive free play when the vehicle is travelling over very bumpy roads, and when it would (without it) be caused to swing up and down unduly. One of these devices is introduced between each axle and each side of the frame, so that there are four in all on the car. The first of our illustrations shows the one end of a rear-live-axle, and the other shows the end of the stationary axle on a chain-driven car. In both cases a bracket, A, is rigidly fixed to the frame, and the link, B, is pivoted to it. Another link, C, which is pivoted to a bracket, D,—fixed rigidly to the axle—is connected with the link, B, through a strong spiral spring enclosed in the casing, E. The spring, E, becomes tightened on itself when the axle moves any considerable distance upward towards the frame, and thus acts as a dash-pot for restraining the ordinary side-springs.

Interesting statistics are published by *L'Auto* relative to the export and import trade in Belgium for the past year. From these we find that the import of motor cars from France has been very considerable, being more than ten times the amount of the imports from any other country. Curiously enough, the exports to France are also considerable, and while the imports from Great Britain are very small, the exports to Great Britain come second to those to France. Belgium is a great importer of accessories and subsidiary parts, mainly from France and Germany, so we may conclude that a large part of the Belgian industry consists in putting cars together and exporting complete vehicles. It is only in motor cycles that the Belgian exports to France exceed the imports from that country.

Mr. C. J. Glidden, of Boston, whose exploits in driving a motor car north of the Arctic Circle we chronicled last summer, has decided on undertaking a tour round the world. Mr. Glidden intends starting next July, and will journey through France and Switzerland to the South of Italy, whence he will cross to Algeria, travelling along the northern coast of Africa, through Arabia, to India—if he can. We say "if he can" advisedly, as the difficulties he will encounter in Arabia and Baluchistan will make him look back on his Swedish experiences as a pleasant pastime in comparison. From India Mr. Glidden intends to cross China, and return across America to Boston. A new 24-h.p. Napier car is being built for Mr. Glidden's trip, at the new Napier works at Acton.

THE BROUHOT PETROL CARS.

THE latest Brouhot 4-cylinder models, which are being made in four sizes of 12-14, 15-18, 20-24, and 40-60 h.p., are well-made machines, having many interesting features; they have either armoured wood or pressed steel frames to suit the wishes of purchasers. A 15 to 18-h.p. car, fitted with a phaeton body, having a canopy top and glass windows, is shown in one of our illustrations, and a 40 to 60-h.p. racing car in another. A 12-h.p. chassis, typical of them all, formed the central attraction of their stall at the Paris Salon, and the illustrations we give are reproduced from photographs taken of it. Fig. 1 shows the rear portion of the chassis, and is taken from behind and above. The vehicle is of the chain-driven type, and is constructed with a pressed nickel steel frame. The engine has four cylinders, and is mounted upon an underframe. The semi-elliptic side springs above the rear axle are arranged outside the frame, are very long and flat; they are attached to long spring-horns projecting from the frame proper. The general appearance of the engine is seen in Figs. 2 and 3, where it will be noticed that a belt-driven fan is arranged behind a honeycomb radiator in front.



A 15-18-h.p. Brouhot Petrol Car, fitted with Canopy Top.

The engine has its cylinders cast in pairs. All the valves are operated mechanically, and are arranged on the same side. An ordinary high-tension ignition system is employed, though the company fit a dynamo for automatically recharging the accumulators when required. The ignition plugs used are of unusually large size, and are fitted centrally into the heads of the cylinders. The commutator is carried on the end of the cam-shaft, and is accessible from the front of the car. A separate coil is used for each cylinder, and each coil has its own trembler. The crank-shaft is made of specially hard nickel steel, and the bearings in which it is carried in the crank-shaft are adjustable. The base of the crank-chamber can be taken off without disturbing the bearings, and the upper portion has four feet, by which it is fixed to the underframe. The circulating pump is gear-driven, and is of the gear-wheel type; the water-pipes connecting it with the cylinder-jackets and the radiator are very short, and are made of nickel steel tubing.

The automatic carburettor is particularly interesting. It is seen in position in Figs. 2 and 3, and is shown separately with the removable jet taken out in Fig. 4. The branched induction pipes, A, which lead to each pair of cylinders, are fitted with a throttle-valve, B, controlled by the governor through the rod, B^1, but subject to hand and foot accelerator controls. This fitting is attached to the mixing-chamber, C, by the flange, A^1 (Fig. 4). The mixing-chamber, C, is a simple cylinder, in through the bottom of which the petrol is free to flow by the pipe fitting, D^1, from the float-feed-chamber, D. The port in the mixing-chamber is a conical hole, into which a corresponding spigot in the bottom of the removable jet-casting, C^2, fits accurately. A passage is drilled up through the spigot in the casting, C^2, communicating with the jet, C^3. This casting, C^2, is held down in place in the chamber, C, by the cap, C^1, which is screwed down above it. The air enters the mixing-chamber, C, through the pipe, E, in which a spring-loaded valve is fitted so as to retard its flow. The air enters the mixing-chamber past the jet, C^2, and has to flow around over the surface of the casting, C^2, before it can find its way to the throttle-valve, B, and the induction pipes, A. The valve in the tube, E, is a flat circular disc, which more or less obstructs the passage of the air, according to its position in a conical portion of the tube surrounding it. As the quantity of mixture required by the engine increases, so the valve is forced by the entering air to offer less resistance to its passage, thus approximately retaining a constant degree of vacuum in the mixing-chamber; the valve can be adjusted by the screw, E^1. The entire air supply is warmed by a perforated portion of the pipe-fitting, E, which is arranged outside one of the exhaust pipes, as seen in Figs. 2 and 3. The temperature of the air can be varied by sliding the

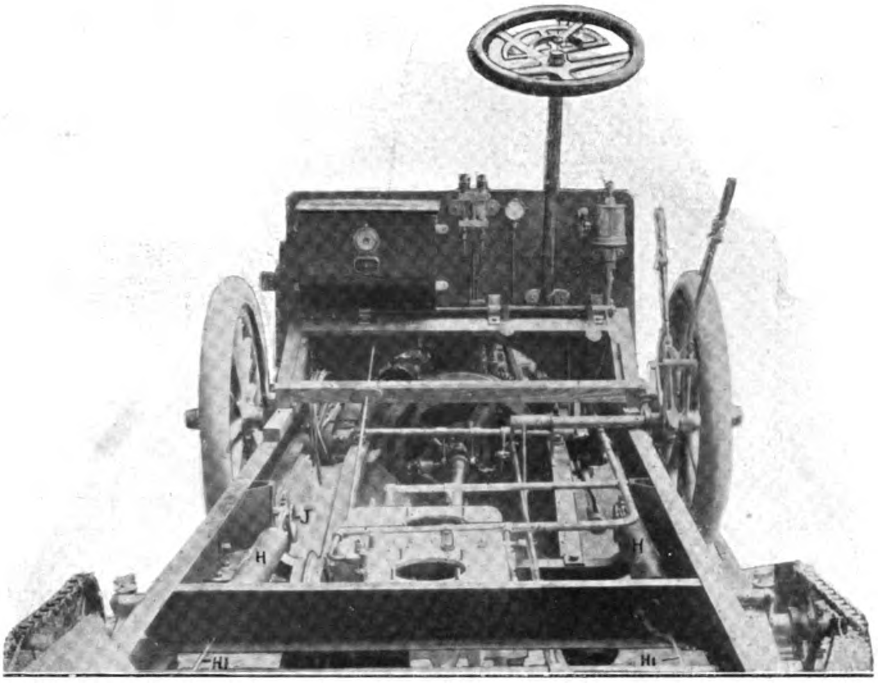


FIG. 1.—View of the 12-h.p. Brouhot Chassis from above and behind.

sleeve, F, over the perforated pipe, and a small screw, F^1, is arranged for locking it in any required position. A spring-loaded auxiliary air-valve, G, is also arranged in the induction pipe-fitting between the throttle-valve, B, and the cylinders, so that a certain amount of cold, auxiliary air is admitted if the throttle-valve is sufficiently closed to give the required suction.

The main-clutch is of a special internal type, acting in much the same manner as an ordinary brake. The band is lined with camel-hair, and is so arranged that it can easily be removed for replacing the lining, if required. The band is made to grip a drum inside the flywheel by the action of a spring and is freed by a clutch-pedal, as usual. By this construction a very light pressure on the pedal is sufficient, and a nice soft action is ensured. A flexible coupling is introduced between the clutch and the gear-box, and the clutch pedal is interconnected with both the foot and hand brakes.

The change-speed-gear is of the sliding-spur-wheel type, and gives three speeds and a reverse, with a direct-through-drive on the top speed to the countershaft. The lay shaft, which lies to the left of the direct-through-shaft, is disconnected from the latter entirely when the top speed is in use, and it does not, therefore, revolve at that time. The gears are all operated by a single lever in the usual way. The gear-box is fixed at some distance behind the clutch, and has a three-point suspension on the frame; its weight is taken by the countershaft at the

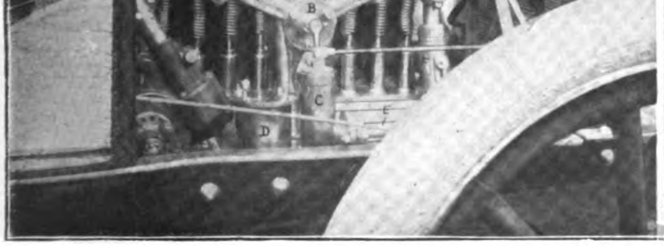


FIG. 2.—A 12-h.p. Brouhot Engine in place in the Car.

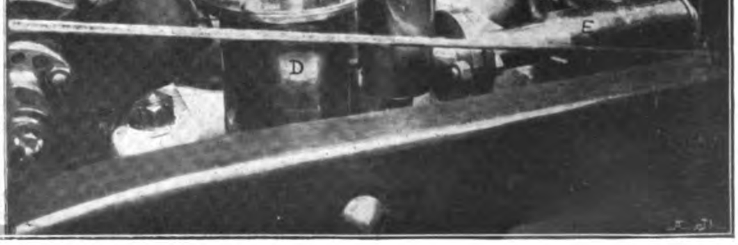


FIG. 3.—A closer view, showing the Brouhot Automatic Carburettor fixed in Place on the Engine.

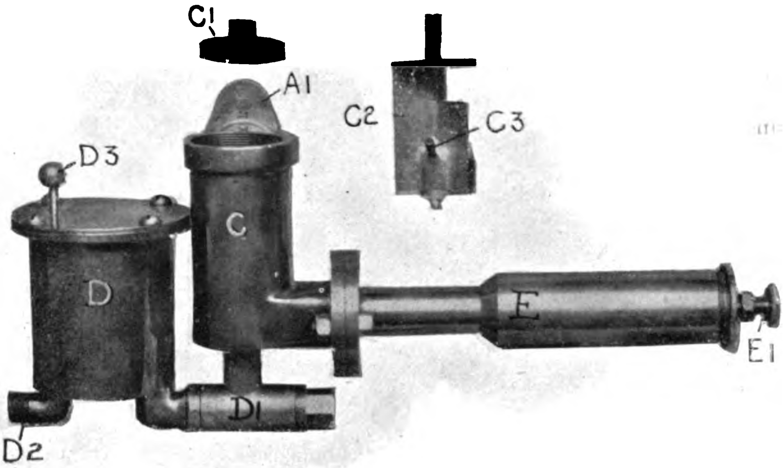


FIG. 4.—The Brouhot Automatic Carburettor, with its Removable Jet taken out from the Mixing Chamber.

rear, and self-aligning bearings are arranged at each end of this shaft.

A metal-to-metal foot brake is fitted on the countershaft, and this is arranged so that it is water-cooled automatically when applied. The rear brakes on the hubs of the driving wheels are of much the same pattern as the clutch; their action is compensated by a steel cable.

We have already referred to the vibration-damping device which is fitted upon this car, and are now able to show the way in which it is arranged. One of the brake-drums, K^1, which are fixed near each end of the stationary back-axle, is seen in place in Fig. 5, where it will be noticed that it is encircled by a brake-band, K, the two ends of which are held together by a sliding-pin and the spring, K^2. The brake-band, K, is secured to the main-frame by the swinging link, L, and it is on the upper side connected by a steel cord, H^1, with a large helical spring enclosed in a stationary tube, H; the position of the tubes, H, is seen in Fig. 1. The front ends of the large helical springs are attached to drums, J, which can be tightened up to the desired extent, and are, for this purpose, fitted with pawl-and-ratchet gear. It is difficult to explain or even to see quite how this device works, but it will be noticed that any sudden movement of the back axle relatively to the frame will cause the link, L, to press the band, K, down tangentially about the drum. As the band is moved in this way the tendency is for it to pull on the steel cable, H^1, stretching the large helical spring. The combined action of these forces tends to lock the axle to the frame, and this effect apparently is sufficient to prevent too free a motion of the ordinary side springs when the car is travelling over extraordinarily bumpy roads. After traversing such abnormally rough surfaces, it is probable that the band, K, gradually slips upon the drum, K^1, and that any movements of the axle up and down are insufficient to make the band, K, bite.

The cylinders on the 12–14-h.p. engine have a bore of 90 mm. and a stroke of 100 mm., those on the 15–18-h.p. model have cylinders 100 by 110 mm., and the bore and stroke of the 20–24-h.p. engine are 120 by 140 mm. respectively. The normal speed in all cases is 900 revs. per min. and the maximum speed about 1,200 revs. per min. The smallest of these three engines has a minimum useful speed of 120 revs. per min., and the two larger sizes will run satisfactorily at 100 and at 80 revs. per min. respectively. The Brouhot Company also make 2-cylinder models.

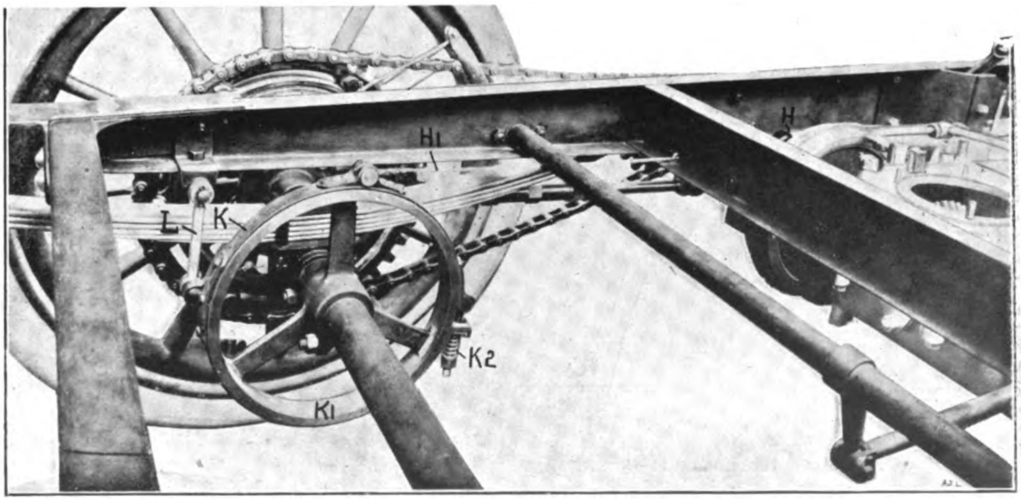


FIG. 5.—The Shock-Damping Device fitted to the Brouhot Car.

THE MOTOBLOC PETROL CAR.

THE Motobloc is one of the comparatively few French vehicles, shown at the recent Salon, which does not follow any usual orthodox arrangement in its design. Although not a new creation—for it was shown at the 1902 Salon, as briefly recorded by us at that time—and although it is unlikely to become the rage to any very great extent, yet it is not without interest, and deserves a somewhat fuller record than it has hitherto received in our columns. The object of the designers has been to condense the engine and the change-speed-gear into as small a compass as possible, and in fact, as the name implies, to construct them as a single unit rather than as distinct mechanisms. There is, of course, nothing particularly novel in this, for it has been the aim of several makers at different times during the past few years—even if their endeavours have not met with any very conspicuous success—but we are inclined to think that more ingenuity than usual is displayed in the construction of the Motobloc mechanism.

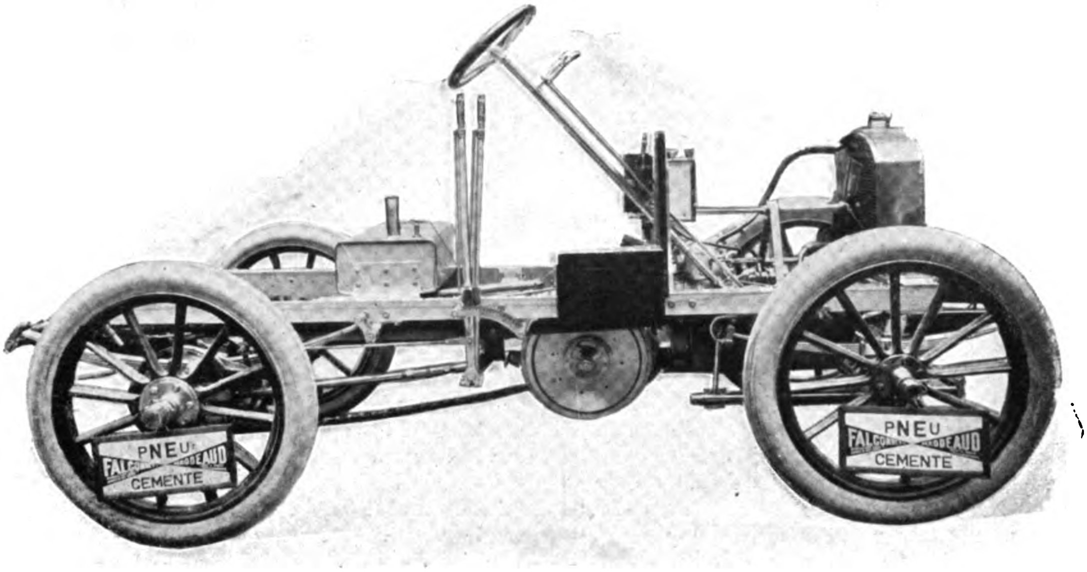


FIG. 1.—The 10-h.p. Motobloc Chassis.

A complete chassis is shown in Fig. 1, and two views of the combined engine and gear are given in Figs. 2 and 3. The engine has two cylinders, which are cast in one piece, and are bolted at an angle of about 45° to a crank-chamber, which has a detachable cover fitted to it. The inlet-valves, which are operated atmospherically, are fitted into the upper side of the cylinder head, and the exhaust-valves face them on the under side. These valves are of large size, and are so constructed that they can be entirely removed, together with their seats. High tension ignition plugs are mounted in the ends of the cylinders, and half-compression cocks are screwed in through the walls. The carburettor, which is of the float-feed-type, is bolted to the cylinder casting, and the explosive mixture is led, through a throttle-valve, from it to a port passing through the casting to the valves. The crank-chamber casting is divided into two compartments, the one of which contains the crank-shaft, and the other a change-speed-gear of the sliding spur-wheel type. The flywheel is fixed to the outer end of the crank-shaft, close up to the crank-chamber, and its other end carries a spur-wheel, on the face of which jaw-clutch members are formed. This end of the crank-shaft is bored out to receive the inner end of the direct-through-shaft of the change-speed-gear, which at its other end projects through the casing, and is fitted with a main clutch. The spur-wheel on the crank-shaft is at all times in mesh with a corresponding wheel of twice the size on a shaft, enclosed in the same casing, which acts as the cam-shaft for operating the exhaust-valves, and as the lay-shaft for the change-speed-gear. This lay-shaft has three other spur-wheels fitted to it, one of which is at all times in mesh with an intermediate wheel for giving the "reverse." The direct-through-shaft has a square section, inside the box, and upon it slides the usual sleeve, carrying two spur wheels and a jaw-clutch member, for giving the three forward speeds and "reverse." The lay-shaft also has a skew-gear wheel mounted on it, which meshes with a corresponding wheel on the inner end of the horizontal shaft seen in Fig. 3, the outer end of which is fitted with a pulley wheel, containing a centrifugal governor, and the commutator.

The main clutch, outside the gear-box, is of the internal-cone type, with ball thrust bearings, and has its inner member fixed adjustably (though rigidly) to the outer end of the direct-through shaft. The external member of the clutch is rigid with a sprocket wheel lying between it and the crank-chamber casting, the power being transmitted from this sprocket to the live-rear-axle of the car by a single chain. It will be noticed that, contrary to usual practice, the main clutch is thus introduced between the change-speed-gear and the axle, instead of between the engine and the gear. The governor on the horizontal shaft is connected with the throttle valve, and the carburettor is water-jacketed. The engine is nominally of 10-h.p., and runs at a normal speed of 1,000 revs. per min.

The chassis is constructed with an armoured wood

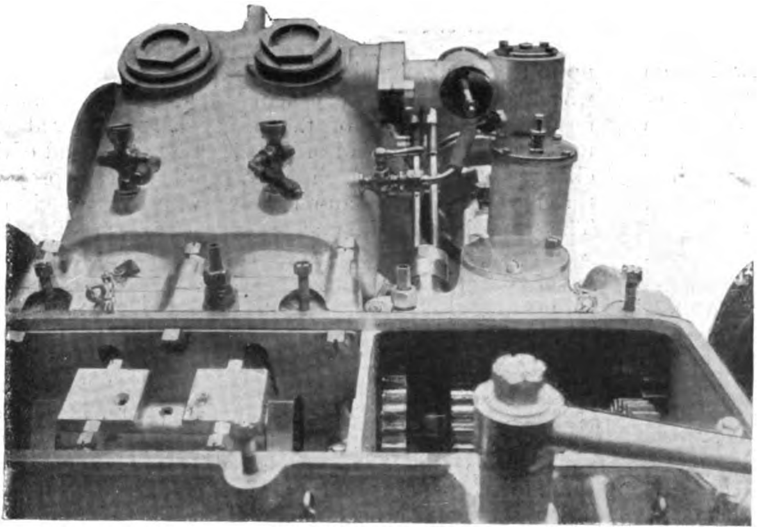


FIG. 2.—View of the Motobloc Combined Engine and Gear, from above and behind —the Cover to the Crank- and Gear- Chamber removed.

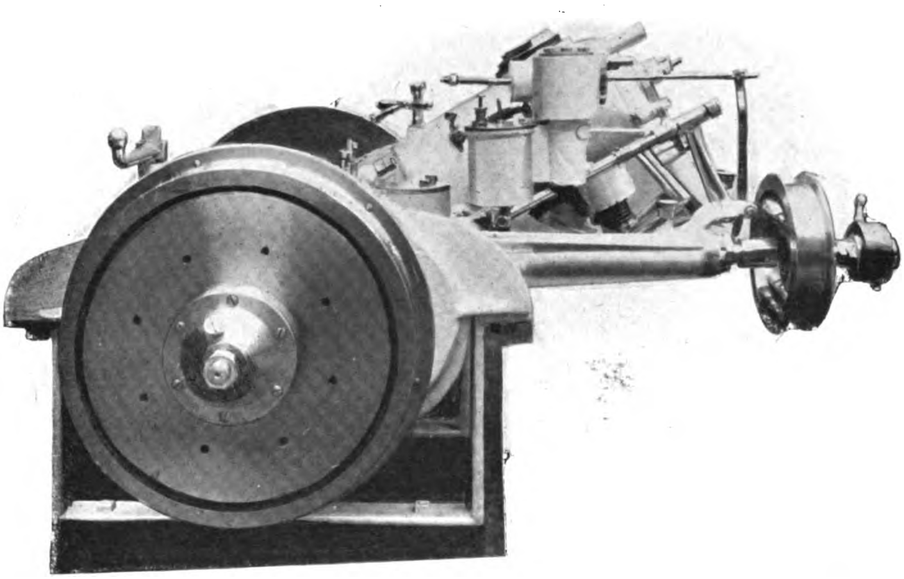


FIG. 3.—View of the Motobloc combined Engine and Gear from the right side, showing the Carburettor, the Governor, and the Main Clutch.

frame, upon two transverse members of which rest four feet, projecting from the crank-chamber casting. The engine lies beneath the dash, with its cylinders projecting forward beneath the bonnet, and its crank-chamber beneath the driver's feet. A honeycomb radiator is fixed in front of the bonnet, and a fan is mounted just behind it; the fan is driven by a belt from the pulley on the governor shaft, and the same belt runs over a pulley on the pump, which circulates the water through the cylinder jackets and the radiator. The frame is mounted upon semi-elliptic springs above the front and rear axles; the rear springs, which have shackles at both ends, lie outside the frame. The two halves of the live-axle are enclosed in tubes which are rigid with the shell of the differential. The differential gear itself is placed centrally, and the chain-wheel by which it is driven lies about mid-way between it and the spring on the right-hand side. The axle runs in plain bearings at each end, the bearings having oil baths, in which run toothed wheels fixed to the revolving axles; these wheels splash up the oil and keep the bearings well lubricated.

A brake-drum is fixed to the chain-wheel on the axle, the band on which is operated by a foot-pedal, and is double-acting. The usual brake-drums are also fitted to the hubs of each wheel, and these brakes are connected as usual with a hand lever. Radius rods are fitted at each side of the car between the axle and the frame.

The speed of the engine is controlled by two small hand levers fitted to the steering pillar, the one of which acts upon the governor-controlled throttle-valve, and the other "times" the ignition. The crank-chamber and the gear-chamber are lubricated from a force-pump on the dash, which is fitted with a two-way cock for this purpose.

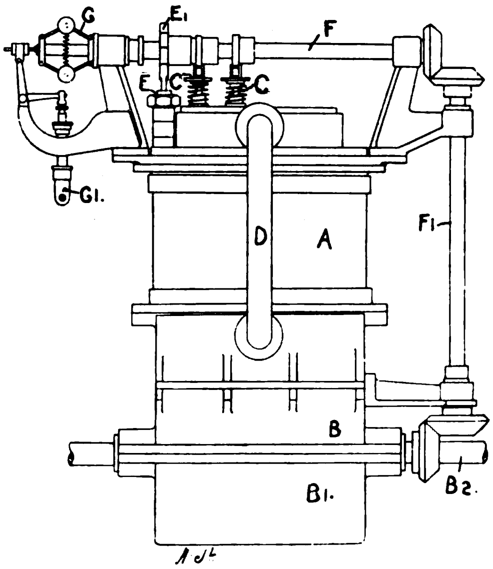
AN effort is being made by the Society of Motor Manufacturers and Traders to bring together a representative British exhibit of automobiles for the St. Louis Exhibition, opening in May this year. America has a huge allotment of space, and both France and Germany have arranged for a very extensive representation. The fact that the space is free and no duty is payable on goods entering the United States for the purpose of the St. Louis Exhibition should help to ensure Great Britain not being entirely left out in the cold. Special arrangements for cheap transit of exhibits have also been elaborated.

ONE of the strong features in connection with the Society of Motor Manufacturers and Traders' Exhibition at the Crystal Palace next month will be the running of cars and cycles in the Crystal Palace grounds. A charge is to be made for this privilege of 3 guineas for each car and 1 guinea for each cycle during the run of the Exhibition. No firm will be allowed more than two cars or cycles in the grounds at one time.

"THE Wanderings of an Electric Spark" is the original title of a lecture to be given by Professor Simpson on February 5th before the Nottingham and District Automobile Club.

THE LONGRIDGE TWO-STROKE ENGINE.

Some particulars are now available concerning the two-stroke engine to which Captain Longridge made special reference in the paper read by him, entitled "Oil Motor Cars of 1902," before the Institute of Mechanical Engineers in October, 1902, his patent specification having now been published. The engine is constructed with two, or a multiple of two, working cylinders, which are closed at both ends, so that the portion on the underside of the piston forms a pump for delivering compressed air to the upper side of the piston in the other cylinder. The two crank pins are set opposite one another, so that the pistons reciprocate in opposite directions in their respective cylinders. While the explosion is taking place in the rear end of the one cylinder, its piston is compressing air in the front end, and this air is admitted through a mechanically-operated inlet-valve to the other cylinder when its piston-rod has about half completed its upward stroke, and has driven out some of the exhaust gases through its mechanically-operated exhaust valve. The piston in this cylinder continues, while ascending, to compress the air, and a rich charge of carburetted air is forced by an independent pump into the head of the cylinder at the time that combustion is required.



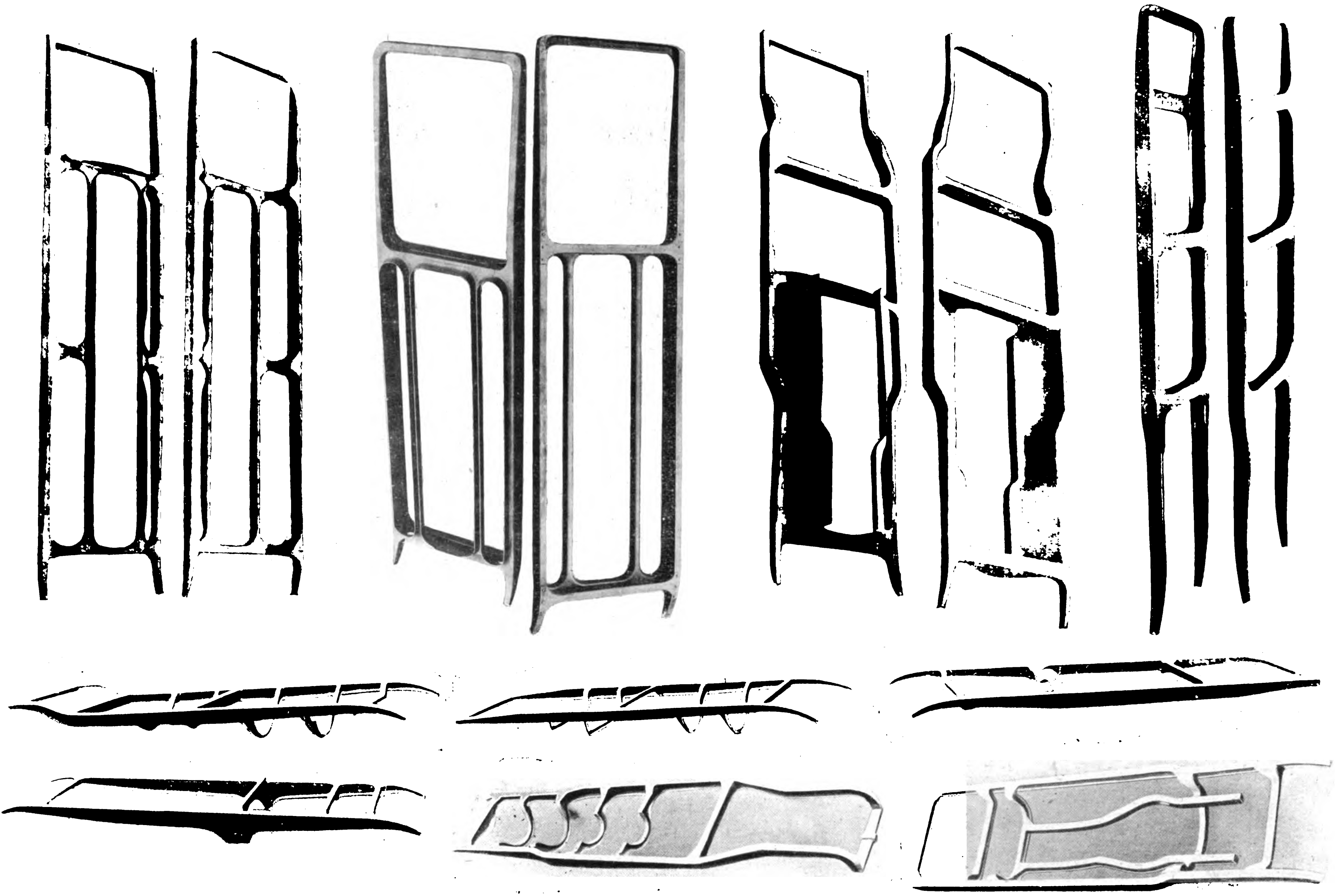
The general arrangement of such a twin-cylinder engine is seen in the illustration which we reproduce, in which A is the casting forming the two cylinders, B is the upper portion of the crank-chamber, B^1 the lower portion, and B^2 the crank shaft. The inlet and exhaust valves, C, are only shown on the one cylinder, but similar valves are fitted to the other, and all are mechanically operated by cams on the shaft, F, which is driven through bevel-gearing and the vertical shaft, F^1, at the same speed as the crank shaft. Atmospheric valves are fitted to allow the air to enter the lower portion of the cylinders, and similarly spring-loaded non-return valves are arranged between these ends of the cylinders and the pipe A, which leads from them to the inlet valves on top. The fuel-pump, E, is driven by an eccentric, E^1, on the cam-shaft, F, and a governor, G, is fitted to control a valve, G^1, through which the fuel finds its way to the pump. The pump has two suction valves, the one for the fuel and the other for air. The passage for the former leads into the bottom of the pump cylinder, and the passage from the other leads into the cylinder at a higher level. During the commencement of each suction stroke, fuel is drawn into the pump, and during the latter portion of that stroke, some of the air, which has already been compressed beneath the pistons in the working cylinder, is admitted into it. The delivery valve of the pump is fitted into the bottom of the pump-cylinder, and communicates with a spray nozzle which projects through the head of the working cylinder into the combustion chamber. A similar pump is used for each cylinder, and provision is made for timing the moments at which they force the rich mixture of fuel and air into their respective cylinders.

Any form of ignition system may be used when starting, but subsequently the intention is that it should be dispensed with, and the charge fired automatically.

The patent specification is numbered 4604 of 1903, and is unusually brief, although accompanied by three sheets of illustrations.

The learned professions are one and all coming to recognise in the motor car the future reformer of our social system. We have Mr. Douglas Mackenzie, at the Surveyors' Institute, pointing out to an appreciative audience that the development of the motor industry is bound, sooner or later, to have a marked effect in decentralising industries by enabling workmen and employees to live at much greater distances from the scenes of their labours. Mr. Mackenzie also declared that motor transport for goods was much cheaper than railway transit, though at present our roads are unfit for an adequate development of this particular service. Of course, the railway rates, particularly for home produce, are preposterously and unconscionably high. Probably the lowering of those rates to something like a reasonable figure will be one of the first effects which the general introduction of motor transport may be expected to produce.

An American investigator has been discovering that gasolene or petrol has a remarkable effect in causing the potato to sprout. He replaced the cork of a gasolene can one day with a potato, and the next day it was sprouting vigorously. After continuing the process for a few days it withered away. He has repeated the experiment with a number of potatoes, and finds that the effect of the gasolene in this respect is unquestionable. Probably the subsequent withering away was due to the potato not being supplied with sufficient moisture to provide substance for the sprouting portion. Whether petrol could be employed, considering the rapidity with which it evaporates, to promote the growth of potatoes from an agricultural point of view, must, therefore, remain doubtful; but, perhaps, if success is ever attained in applying it in this way it may do something to correct the hostility of agriculturists towards the petrol-driven car.



PARIS SALON.—Four Jointless Steel Frames—pressed out in one piece—made by the Co. des Forges et Aciéries de la Marine et d'Homécourt, and six "Arbel" steel frames, made by the Forges de Douai. The longitudinal and transverse members of the former, which are shown both from above and beneath, and on a larger scale, have a ⊏ cross-section for the most part, though some of them are still further bent round, so that the section is more like a C. The six "Arbel" frames, beneath, are those made for leading Continental Automobile Manufacturers, viz. (reading from left to right), Clement, Mors, Richard-Brasier, Panhard, Renard Train (Darracq), and Rochet-Schneider.

A 1904 NAPIER RACING CAR.

ONE of the new Napier racers which has been built for Lieut.-Col. Mark Mayhew, and will, it is hoped, take part in the Gordon-Bennett race this year, forms the subject of our frontispiece this week, and we are able, by the courtesy of Mr. S. F. Edge, to give the following general particulars concerning it.

It is of the live-axle type, and has been rendered as light and frictionless as possible by the adoption of hollow shafts and roller bearings wherever convenient. It has a rolled steel frame, which tapers off towards each end, and this is prolonged in front to avoid the use of long spring-hangers. The front axle has an ⌶ cross section, and is a steel forging of great strength.

The engine, which is nominally of 100-h.p., is placed some little way to the rear of the front axle, so as to increase the weight on the driving wheels, and the radiator, too, is for the same purpose fixed further back than usual. The engine has four cylinders, which are built up of cast-iron liners, forced by hydraulic pressure into aluminium jacket-castings. It has mechanically-operated inlet-valves, which are actuated by cams on the same shaft as those which lift the exhaust-valves, and they are operated through rods and levers which have adjustable tappets; the valves can be inspected very readily. A hollow crank-shaft is employed, giving great strength with small weight. All parts of the engine are lubricated by a drip-feed, which ensures that every bearing is kept properly oiled. A high-tension system of ignition arranged in such a way as to ensure proper synchronism is employed. The petrol is fed to the carburettor either by gravity or pressure, and the power of the engine is controlled by a special throttle-valve, regulated from the steering-wheel. The cooling water is circulated by a chain-driven centrifugal pump, which forces it through the jackets and the radiator. The radiator is of the Albany type, with an unusually large filler cap on top. It has a belt-driven enclosed fan, and is fixed in such a position that natural circulation will take place in the event of the pump failing to work.

The clutch is of the Napier metal-to-metal type, and is self-contained. It is so constructed that it can be operated satisfactorily whether it is covered with oil or is dry, and it is so designed that it is not damaged if allowed to slip. A very light pressure on the pedal is sufficient to release it, and it is said to be very soft in action, although not liable to slip when transmitting the full power of the engine. The pedal is fitted so as to be pushed forward by the driver's feet, and the driver's seat is so placed that he is relieved of much of the strain in a long race, because the clutch can be used with but very little exertion. The clutch is normally held in engagement by three easily adjustable springs, and all the thrusts are taken by ball bearings.

The shafts in the change-speed-gear are hollow, and are mounted in roller bearings. The gear is so designed that a direct-through-drive is obtained on the top-speed, and that the lay-shaft can then remain stationary. The universal joint on the forward end of the propeller-shaft is fitted inside the gear-box, and therefore runs in oil, and the back, compensating square shaft is so made as to need no lubrication. The live-axle has roller bearings throughout, and is so arranged that they run in an oil bath. We are told that the brakes are extremely powerful, and it is believed that this is the highest-powered car having a live-axle which has ever been successfully built. The usual Napier steering-gear, which, it will be remembered, is adjustable wherever wear can take place, is employed on this powerful racer.

RACES, RECORDS, AND TRIALS.

GORDON-BENNETT CUP RACE.

THE German Club intend to leave no stone unturned to ensure an absolutely complete success for the running of the race in June. Every precaution is being taken to avoid the possibility of accidents, and although it is officially acknowledged that the arrangements will be based upon the extremely successful lines laid down for the race held in Ireland last year, it is hoped to even surpass that perfect organisation on the Taunus Circuit.

IN France the discussion is still very keen in regard to the locality for holding the French Eliminating Tests. Naturally the Circuit des Argonnes, in the French Ardennes, is first favourite, not only with the French Club and drivers, but also with all those in the immediate neighbourhood of the circuit, but the French Government remain to be reckoned with. So far they have not accorded their official consent. The actual circuit proposed is to start from Flize, and return to the same spot *viâ* Chemery, Beaumont, Carrefour de Stenay, Buzancy, Carrefour de Vouziers, Le Chesne, Carrefour de Poix, a total distance of about 130 kiloms. In the whole of this run there are only three villages, viz., at Beaumont, Buzancy, and Le Chesne, and these are only very sparsely populated.

ANOTHER course is the Circuit du Sud-Ouest, which has been the scene in past years of some splendid racing, in which Albert Lemaitre, René de Knyff, and Maurice Farman have been conspicuous. The third suggested course is the Algerian Circuit, but the cost of reaching this course very greatly militates against the possibility of its being chosen, and, failing the tests being run on French soil, there is little doubt that the Belgian Circuit des Ardennes will be the favoured spot, in which case arrangements would be made to not only have the timing of the French cars carried through by French timers, but as far as possible the Taunus route would be imitated in regard to neutralised portions, &c.

SOME slight variations in the actual route for the Ardennes course will probably be made, starting from Bastogne, which will give 138 kiloms. to the complete circuit.

A FEW further names of likely drivers have transpired since our last issue, amongst these being Thery, who will drive a G. Richard-Brasier for France, and Augieres, who will be in the "Pipe" team for Belgium.

HERR THEODORE DREHER, the Austrian beer king, is owner of one of the Wiener-Neustadt cars which will take part on behalf of Austria.

IN the "standing start" and "standing stop" 500-metre event, held at Antwerp on Sunday last by the A.C. of Antwerp, the best time was made by Elskamp, of 50⅗ secs. on a 20-h.p. Gobron-Brillié car; Joostens was second in 59⅗ secs. on a 12-h p. Clement, and De Beukelaer third, on a 16-h p. Vinck, in 1 min. 1⅖ secs. In the consumption trial following, in which the competing cars received 1 litre of petrol per 1,000 kilogs. of weight of their vehicle, the winner was Joostens on his Clement (1,090 kilogs.), who accomplished the distance of 11·85 kiloms. on his fuel allowance. De Beukelaer, on his Vinck (1,070 kilogs.), was second with a distance of 7·1 kiloms., and Knoops, on a Vivinus (825 kilogs.), was third with 5·4 kiloms.

WITH a mile flying start H. Ford, on his 70-h.p. racer, is announced by cable from America to have covered the mile in 39⅖ secs. This gives the marvellous speed of 91·37 miles per hour, beating Augiere's World's Record on a Mors by 6⅗ secs. The record took place on an ice-covered inlet off Lake St. Clair, where a 4-mile course was swept clear of snow for the purpose.

A NUMBER of competitions will be decided during the Brussels Automobile Salon. In addition to the regular prizes for well-appointed cars, both open and shut, decoration and lighting of the stands, there will be a competition for silencers for motors over 8-h.p. A further prize is being offered for a novel object, viz., for the most effective souvenir presented to visitors by exhibitors.

FOLLOWING the lead of Great Britain and France, the A.C. of Belgium are also organising side-slip trials, which will probably last six months.

THE German Automobile Club are organising a motor boat contest in connection with the Kiel Regatta in June, immediately following the Gordon-Bennett Race.

EVERY effort is being made by those responsible for the Ormonde-Daytona races in California, commencing at the end of this month, to ensure a huge success to the meeting. Their efforts in the interests of the automobile industry are the more praiseworthy as there is no revenue whatever derived from the meeting. Electrical apparatus for timing is in course of erection, 30 miles of wire being required for the purpose.

W. K. VANDERBILT, JUN., who has entered for all events possible at the Ormonde-Daytona meet, has offered the American Automobile Association a magnificent Cup, as a prize for a contest in America over a distance of between 200 and 300 miles.

MARCH 15-16 are the dates appointed by the A.C. of America for their second annual contest for light and heavy commercial vehicles.

MR. MAX DESMOUCEAUX has devised a submersible boat actuated by an explosion motor and driven by "picratine." This vessel, which is destined for extensive trials at Brest, has been already experimented with on the Marne, where, however, it unfortunately experienced an accident owing to the clutch sticking and the boat running aground in consequence.

CLUB DOINGS.

Peterborough and District Motor Club.—A meeting was held at Peterborough on Saturday, January 9th, to consider the desirability of establishing a motor club for the district in order to further the cause of automobilism, to promote the sport and pastime of motoring, and to arrange reliability trials, tours, and other competitions. There was a satisfactory attendance, and it was unanimously decided to form a club to be called "The Peterborough and District Motor Club." Upwards of thirty motorists have already given in their names to support the club, the headquarters of which will be at the Angel Hotel, Peterborough. The subscription has been fixed at 10*s.* 6*d.* per annum. Mr. F. T. Heighton, of the "Vinco" Cycle Works, Elton, Peterborough, has undertaken the secretarial duties with Mr. P. Mays, of Bourne, as Assistant Secretary.

CORRESPONDENCE.

⁂ *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letter intended for insertion, or containing queries.*

THE POSITION OF MOTOR VEHICLES OVER THREE TONS IN WEIGHT UNDER THE LAW OF 1903.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—I took up this week's copy of THE AUTOMOTOR JOURNAL expecting to find indignant letters from manufacturers and users of heavy motor vehicles. It speaks volumes for the patience and forbearance of this section of automobilists that so little is heard of their grievances. The Act of 1903 has now come into force, and it is found that no provision has been made for the registration of motor vehicles weighing over 3 tons. Not to be eligible to carry a number may not at first sight appear to be a serious grievance, until it is realised that now all unnumbered motor vehicles are traction engines! That this is no imaginary difficulty is proved by the fact that at least one County Council—and probably more—have refused to register vehicles of declared weight over 3 tons—as no doubt the law entitles them to do. Only two courses are open to users of such vehicles—either to return a false weight and so get registered, or to take out a licence as a traction engine, with its attendant restrictions.

If neither of these courses are followed, the user is liable to prosecution, until the Local Government Board publish their new regulations. But as, I understand, the Departmental Committee to consider these has not yet been appointed, there appears little prospect of a speedy settlement of the question, and some working arrangement ought to be come to in the meantime, to avoid the enormous loss that would be entailed by all the motor vehicles over 3 tons being prevented from running except as traction engines.

Of course such vehicles on the road are at present illegal, but the experience of builders is that a heavy motor lurry that will carry sufficient load to make it a commercial success, and not be in continual need of repairs, cannot be built to weigh anything like 3 tons. No attempt has been made by the authorities to stop the use of heavier vehicles, although it has been a matter of common knowledge that the legal weight is far exceeded in the majority of cases; consequently makers have been encouraged to go on building, in the expectation of the weight limit being considerably raised; and now a large number of such vehicles exist.

It behoves manufacturers of heavy vehicles not to miss this opportunity, which may not recur for a long time, of impressing their views on the Local Government Board, as to the limit of weight within which it is possible to build commercially successful vehicles. In my opinion the permissible tare weight should certainly not be limited to less than 7 tons; or, say, a gross load of 16 tons, including the weight of vehicle, water, coke, oil, tools, &c., and useful load. In order to protect bridges of inferior strength, it would be more logical to limit the gross axle load, and allowing for the fact that the load on the back axle is generally considerably greater than that on the front wheels, this should not be less than 9 or 10 tons. The width of tyres should of course be proportional to the axle load.

These loads will probably be considered rather under than over the mark, and unless the new regulations, when published, contemplate loads at least equal to the above, great monetary loss and discouragement will be inflicted on a large body of enterprising manufacturers, who, in advance of the law, have done their part to establish and maintain the supremacy of Great Britain, in this class of manufacture, at a time when the country can ill afford to sacrifice a promising industry.

Yours, &c.,
A. W. BRIGHTMORE.

Egham, Jan. 8th.

REVIEWS OF BOOKS.

"Encyclopædia Britannica."—10th Edition. Volumes 34 and 35. (Adam and Charles Black, Edinburgh and London, and *The Times*, Printing House Square, London, E.C.)

THESE two volumes, which terminate the 10th edition of this monumental work, include respectively the maps, with geographical index, and the general index to the whole Encyclopædia, including the 9th edition. The Volume 34 comprises a really wonderful collection of maps. The detail at every point at which we have been able to test it, is marvellous, the smallest places being reproduced, while the general get-up, colouring, and appearance of the maps are equal to the finest atlases published, though, of course, the size of the volume precludes the possibility of the maps attaining their ordinary dimensions. This, however, is no real disadvantage, as it is much more satisfactory and handy to have the various countries cut up into small sheets than to have to hunt across a huge page. The index to the maps forms probably the most complete gazetteer yet published. However small the place that one may desire to find, one can spot it at once with the assistance of this marvellous index.

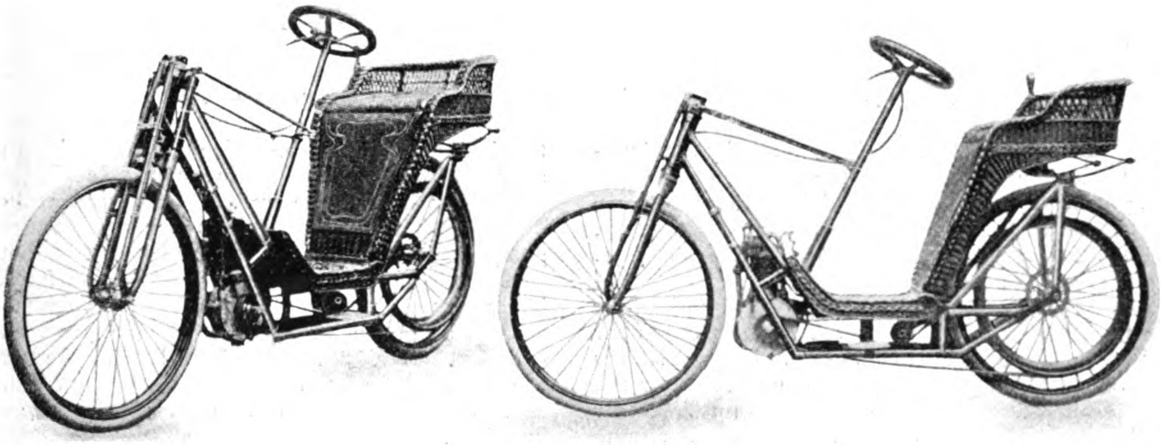
The general index to the volumes includes the index to the maps (an almost unnecessary refinement), so that one has one's choice of looking up a place either in the map index or in the general index. The methods of cross reference adopted are all that can be desired, and, where a place or name is spelt more than one way, it is duly indexed under both spellings. Even the names of firms, as Panhard and Levassor, appear under both names.

The printing and get-up of both volumes are in the same handsome style as the other volumes, and the purchaser of Volume 35 will have the satisfaction of knowing that he has a complete index, not only to the new volumes comprising the 10th edition, but to the whole of the 9th edition as well.

THE new Motor Car Act has already produced some legal manuals. We have pleasure in noticing amongst these:—"The Law Relating to Motor Cars," by H. Langford Lewis and W. Haldane Porter, both Barristers of the Middle Temple, at 2*s.* 6*d.* net. (London: Butterworth and Co., Bell Yard.) This is a little work of very handy size, giving both the Acts of 1903 and 1896, with commentaries, and, as far as we can see, all the cases that have been decided in the Divisional Courts on any of the main points. It is a sort of book that every automobilist will find useful. It is lucid, well put together, and the discussion of cases is kept within bounds, while it enables the motorist to form an accurate idea of what he is to expect. There is only one fault to be found with the work—that the index is very fragmentary, and is, in fact, an index in little more than name.

A similar work, "A Handbook on the Motor Car Acts," by James McConnell, Barrister-at-law, has been published by Mecredy, Percy and Co., of Dublin, at 1*s.* net. It is much on the same lines as the preceding. It gives the two Acts, accompanied by a very short commentary which cites cases, though not quite as fully as the work above referred to. It has, however, the advantage of a more complete index.

A NOVEL MOTOR BICYCLE.



A VERY attractive variety of the motor bicycle has been designed by M. Meijer of Velp, near Arnhem. It combines some of the advantages of the motor bicycle—the single-line track, lightness and ready storeability, with a good deal of the comfort of the small voiturette. The illustrations, which we reproduce from *La France Automobile*, are self-explanatory. A strong double frame carries a basket seat like that of a trailer instead of the ordinary cycle seat. The motor is mounted under the forked down-tube of the frame, and wheel steering is employed. The drive is by belt to the rear wheel, and this is tightened by a jockey pulley. The motor is first started by a handle, the rider then takes up position, with one foot on the footboard, pushes off and mounts on one of the steps, gradually tightening the belt by depressing the jockey pulley by means of the lever shown on the right-hand side of the seat. When a certain speed has been attained he can quietly sit down on his seat and drive as if on a car. Should the new design prove satisfactory in practice it is likely to be very popular, as it enables the possessor to avail himself of some of the principal advantages of the motor bicycle without its attendant disadvantages and comparative discomfort.

ON January 13th Mr. Eric Stuart Bruce will give a lecture at the Society of Arts, particularly adapted for juveniles, upon the "Navigation of the Air."

THE total number of Cars registered in the London County Council district is gradually creeping up. Already 3,000 cars and cycles have had their numbers allotted, and close on 4,000 drivers have inscribed their names.

AMONGST the latest firms elected as members of the Society of Motor Manufacturers and Traders are the Continental Caoutchouc and Guttapercha Company, Limited, the Gladiator Company, and La Société Française des Clements et Gladiator.

AFTER covering 30,000 miles on a motor tricycle it is hardly unreasonable to expect the gears to commence being slightly noisy. Mr. G. Burnell, from Rugeley, writes that he has ridden his Ariel tricycle that distance and for the first time on a recent trip had occasion to complain of a little "music."

CONSIDERABLE efforts have been made by the Automobile Club Secretary to ensure the success of the first smoking concert of the season, which was announced to take place at the Club house on Thursday of this week, commencing at 9.30, preceded by a House dinner at 7.30.

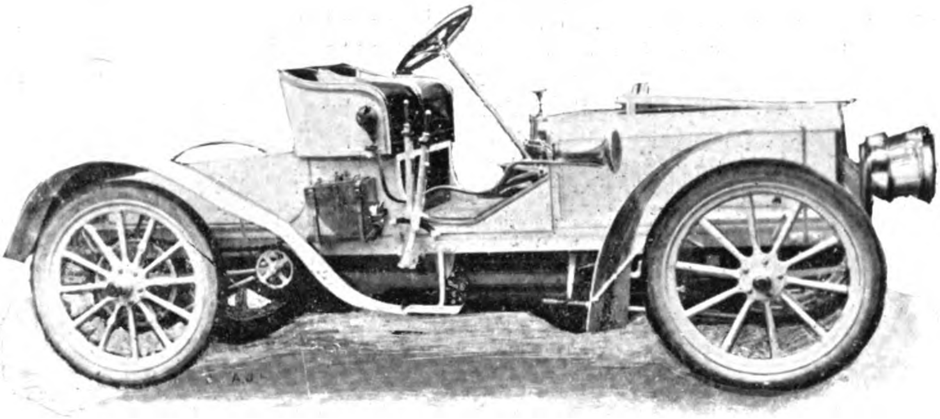
A GRANT of £250 has been approved by the War Office to members of the Motor Volunteer Corps for exceptional wear and tear of cars used in last year's army manœuvres. This is the promised contribution by the military authorities referred to at the Motor Volunteer Annual Dinner, which was dealt with by us in our issue for December 12th.

MAJOR BOWER, the Chief Constable for the North Riding, has been allotted £300 by the Yorkshire authorities towards the purchase of a motor car in lieu of the present allowance of £60 per annum for his railway pass for the next five years. This will enable the Chief Constable to pay more frequent visits to the several stations in the North Riding than has hitherto been possible by rail travelling.

THE visit of the King and Queen to Chatsworth has provided one more trenchant object lesson, if any were still needed, of the additional power of enjoyment which the motor vehicle confers upon its possessors. The whole Royal party were enabled to travel the exceedingly hilly road from Chatsworth through Chesterfield to Hardwick, lunch there, inspect the picture gallery, hall, and grounds, and return to Chatsworth again by five o'clock.

THE appointment some time ago of a special Advisory Motor Board, by the General Accident Assurance Corporation, Limited, has proved in practice of considerable value to the Corporation in handling satisfactorily the rapidly growing business which has been brought into existence by the automobile industry. A number of well-known men in the automobile industry have for some little time been on this Advisory Board, and the latest addition is Lieut.-Col. Arthur F. Mulliner, V.D., of Northampton.

The First Victim.—Mr. Harry Smith, of Coliseum Terrace, Regent's Park, enjoys the distinction of being the first victim whom the police have offered up on the altar of the new Act. A police constable charged him with being drunk while driving a motor car at 8 o'clock on Tuesday morning. It was admitted that he was going slow, but the reported evidence does not show that he was drunk, nor even "the worse for liquor." The policeman merely asserted that he wobbled about, and was on the wrong side of the road on one occasion. Mr. Smith explained that he was on the wrong side of the road in attempting to get past some horse-drawn vehicles which were blocking him. The worthy magistrate, Mr. Marsham, came to the conclusion that Mr. Smith was clearly driving recklessly and to the common danger, although, be it observed, the policeman even admitted he was going slowly. As the maximum penalty is £20, the magistrate considerately fined the defendant £10, with a further 5*s*. fine for not having his licence with him, and the reassuring promise that future cases of being without a licence would be more severely dealt with. This is a nice sample of the first-fruits of the new Act—£10 fine straight off in a more than doubtful case. It illustrates the beautiful elasticity of the expressions "recklessly" and "to the common danger" in the magisterial mind.

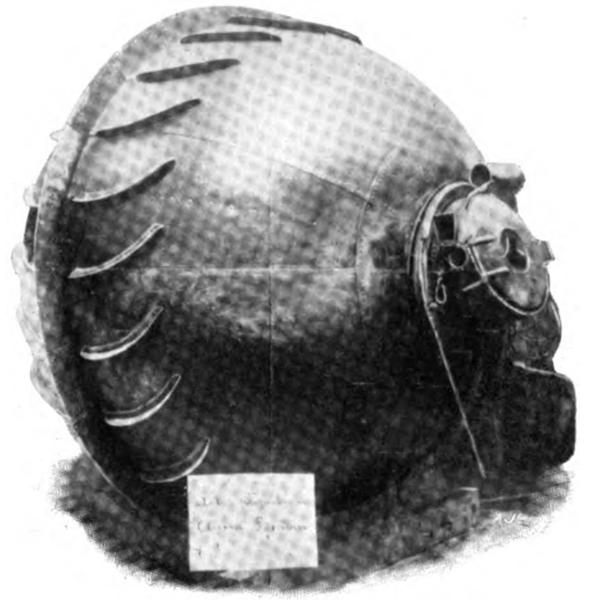


A 40–50-h.p. Brouhot Petrol Racer.—A Description of this System appears on pp. 64–66.

To be assured in the event of sudden tyre troubles when far from home that no mistake will be made in dispatching the correct tyre is a matter of very great moment to the stranded automobilist. With the idea of providing for this difficulty the Continental Caoutchouc and Gutta Percha Company have just issued a special telegraphic code for ordering their Clipper-Continental motor tyres, so that any form of tyre, whether complete with rim, short or long valve, inner tube, &c., can be ordered by telegraphing, in most cases, one word.

THE Car and General Insurance Corporation, Limited, have now moved into permanent head offices on the first floor of 1, Queen Victoria Street (Mansion House), E.C. It is gratifying to learn that a large amount of support has already been accorded to this newly-established Company, and Mr. Fred Thoresby, the general manager, is extremely sanguine in connection with the business, the pressure to deal with which requires his personal attention until 9 and 10 o'clock every night.

OPENING on May 1st, the Arras Automobile Salon promises to be of considerable importance, as not only has the Government accorded its official patronage, but the King of the Belgians is the honorary president, and the inauguration of the Exhibition will coincide with the visit of the President of the French Republic, M. Loubet, and the ministers and the Governor-General of Algeria. Picturesqueness will be given to the opening ceremony by the suite of Arab chiefs who will accompany the Algerian Governor-General. A reliability trial and speed events will be run off.



The Adam-Boudin spherical motor boat, of which we gave some particulars last week, is seen in the above illustration. The 24-h.p. motor and the passengers are accommodated in an inner stationary sphere around which the external sphere revolves, propelling the "boat" along by the paddles on its periphery. Access is had to the interior through the central trunnions which form bearings for the revolving portion, and prisms are arranged in these caps to enable the pilot to see where he is going. The claims made for this peculiar craft are that it is unsinkable, unusually stable, and is useful either for transport or salvage.

IT is rather annoying to learn that the silly restrictions which in many parts of Switzerland are so much interfering with the freedom of automobile tourists are being introduced to a great extent also in the Black Forest. The Black Forest has not only exquisitely picturesque scenery but magnificent roads as well, and it is more unfortunate, therefore, that the local authorities have seen fit to close some of the important roads to automobiles and exact a penalty of as much as 60 marks from any automobilist who presumes to drive his car along them. It appears possible to get through the greater part of the Black Forest in spite of this restriction, but tourists would do well to ascertain beforehand from the local authorities whether any roads on the tour they intend to make are prohibited.

PENDING the completion of the railway from Locarno to Gravelona on the eastern shore of Lake Maggiore, an international service of automobiles is to be run, joining up the Simplon and Gothard railways.

TEN horses and three drivers are to be replaced by a motor wagonette, built by the Mobile Company of America, for running between Santa Maria and Gaudaloup, California. The distance between these two points is 10 miles, and the motor wagonette will be able to carry 12 passengers, accomplishing the distance in about half an hour. The roads are both good and level.

THE ambitions of M. Archdeacon, who, as our readers know, takes a great interest in aeronautics, have been fired by the experiments of the Brothers Wright. He has been looking round in consequence for some sand-dunes, like those of North Carolina, on the coast of France, and has, we understand, discovered a suitable spot in the neighbourhood of Merlimont, north of where the Somme flows into the English Channel. There, we trust, M. Archdeacon will soon be found learning to imitate the birds as successfully as the Brothers Wright have learned to do in Carolina, and that before long he will be able to attach a motor to his aeroplane, soar across the Channel, and alight at the Lord Warden Hotel. But M. Archdeacon must remember that the sand-dunes are not the only things required for successful experiments in aviation. One of the features of the North Carolina coast is the steady breeze which, for months together, blows shoreward from the Atlantic at an average pace of 20 miles an hour. It is this breeze that has enabled the Wrights to make such successful use of their own abnormal dexterity and great ingenuity. In attempting similar experiments amid the treacherous breezes of the Channel coast, M. Archdeacon will have to exercise most extraordinary care and vigilance. Should he attain success his triumph will be all the greater.

MR. SHORT, of London, is going to take part in the St. Louis World's Fair aeronautical contest. While most other competitors are building navigable balloons, airships, and flying machines for this competition, Mr. Short is constructing a balloon with which he hopes to attain greater altitudes in the atmosphere than ever have been reached before. One of the difficulties attending attempts to reach the higher strata is due to the difficulties which the aeronauts have experienced in breathing above a certain height. Mr. Short's balloon is designed to overcome this difficulty. His machine will consist of an enormous balloon of 500,000 cubic feet capacity. Below this will be carried the ballast car, from which ballast can be shot by a system of levers operated by ropes from the car proper. The car proper containing the passengers will hang below this and take the form of a steel shell, which can be hermetically sealed in and provided with a supply of compressed air carried in suitable tanks. By this means it is hoped the pressure and air inside the passenger's car will be maintained in such a condition that they will be able to breathe at any altitude the balloon may reach without difficulty. Of course, there is the further trouble that the lifting power of the balloon diminishes the higher it rises in the atmosphere, but presumably this can be got over by an adequate supply of ballast.

THERE is a veteran Daimler car at present out in Madagascar over whose somewhat inglorious end it is impossible to avoid shedding an automobilious and petrolescent tear. This venerable production of the genius of Gottlieb Daimler ran in the Paris-Marseilles Race in 1895, though we have not been able to learn exactly where it came in on that occasion. It was taken out to end its days in Madagascar in 1900, where it was perhaps thought that the warm southern climate would mitigate the rigours of approaching old age; but, alas and alack! the roads in that recently-acquired French earthly paradise are far from having attained the excellence of those in the mother country, and on its first tour of 357 kilometres from Majunga to Antananarivo it broke down badly, and arrived at the latter town under the escort of two mules, arranged tandem and ridden postillion by two of the natives. The old car was patched up again, and ran for some time, but its owner has now taken off the motor and sold it to a manufacturer, who uses it to run machinery. All the gear has likewise been removed, but the exceedingly comfortable body and wheels have been provided with shafts and converted into a kind of two-seated rickshaw, in which the owner and his wife and family may now be encountered tugged by natives about the mountainous Madagascar roads. *Sic transit.*

IF the description of the rather unromantic end of this ancient vehicle should convey the impression that automobilism is being neglected in that island, that impression would be a very false one. The French are proceeding to civilise their new possession by the motor car, and already several modern Panhard machines have been imported and are doing good service, particularly on the east coast. The roads generally throughout the island have until recently been little better than tracks, but the French engineers, notably Capt. Gruss, seconded by Adjutant Grimaud, are getting to work upon them, and now Madagascar can boast several considerable stretches of excellent road. Like the Romans in old times, the French have shown themselves pre-eminently the road builders of the modern world, and if they provide Madagascar with a system of roads constructed and engineered in their usual excellent style, the gift will go a long way to justify their acquisition of the dependency.

THE Motogear Engineering Company notify us that they have removed to more extensive premises at 12, Emerald Street, Theobald's Road, W.C. The speciality of this firm, as our readers will remember, is high-class gearing of every description, including special raw hide and fibre pinions.

WE are advised by the Automobile Components, Limited, that they have acquired a fifteen years' lease of extensive premises at 366-368, Euston Road, Regent's Park, N.W. These premises, which have been suitably fitted up for the motor car industry, consist of four floors, 196 feet long by 30 feet wide. It is requested that all communications shall for the future be sent to their new address.

JAMES MILNE, of 60, High Street, Inverurie, is placing on the market a detachable back number illuminator, which, in addition to complying with the new regulations requiring the registered number to be visible at night, also shows red lights, thereby killing two birds with one stone.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

S. R. Bailey and Lambert (Limited), 217, Piccadilly, W.—Capital, £5,000 in £1 shares. Object, to adopt an agreement with S. R. Bailey and L. Lambert, and to carry on the business of manufacturers of, dealers in, and agents for motor cars, carriages, &c. First directors, S. R. Bailey and L. Lambert (managing directors).

J. S. Critchley (Limited), 77, Chancery Lane, W.C.—Capital, £3,000 in £1 shares. Object, to adopt an agreement with J. S. Critchley for the acquisition of the business of manufacturers of motor cars and motors for launches, &c., carried on by him. First directors, J. S. Critchley and W. H. Brown.

Kidderminster Motor and Cycle Company (Limited), Mill Street, Kidderminster.—Capital, £5,000 in £1 shares.

Samson Leather Treads and Tyre Company (Limited). —Capital, £8,000 in £1 shares. Object, to carry on the business of manufacturers of and dealers in pneumatic and other tyres. (Registered in Guernsey.)

West Midland Motor and Cycle Company (Limited). —Capital, £3,000 in £1 shares. Object, to adopt an agreement with F. W. Baker and Mrs. B. H. Baker, to acquire the business carried on at New Road, Stourbridge, as the West Midland Cycle Company.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published January 21st, 1904.

28,053. J. C. PHELON. Spray carburettors.
28,075. E. BUTLER and others. Explosion engines.
28,145. H. S. HELE-SHAW. Friction clutches, brakes, and the like
28,145A. H. S. HELE-SHAW. Starting, stopping, speed controlling and reversing gear.
28,471. R. H. RAINS. Brake.
28,593. J. W. FAULKNER AND HILTON. Two-speed gearing.
28,612. G. E. BENNETT. Brake mechanism.

Applied for in 1003.

Published January 21st, 1904.

120. W. E. CARMONT. Road motor vehicles.
437. H. S. CHAPMAN AND A. D. JARVIS. Internal combustion engines.
870. J. W. MADIGIN. Storage batteries.
2,762. C. H. WORSNOP. Reflectors for motor lamps.
3,398. C. CHALLINER. Pneumatic tyres.
3,578. A. DUNCAN. Motor bicycles.
3,824. T. AND S BRADSHAW AND M. SUTTON. Motor wagons.
4,044. S. BUTLER. Non-skidding device.
4.104. G F. LAWRENCE AND A. J. FIELD. Motor cycles.
4,235. W. ROSE. Starting device.
4,267. J. W. HUNTER. Single-track motor cars.
4,418. J. G. ACCLES and others. Motor cycles.
4,510. W. J. CROSSLEY. Internal combustion engines.
5,981. M. S. NAPIER AND A. J. ROWLEDGE. Carburettors.
6,704. P. G. TACCHI and others. Speed-change gear.
7,451. J. AND J. F. INSHAW AND A. W. AUSTER. Axle caps for facilitating lubrication.
21,307. X. WEHRLE. Driving and transmission mechanism.
22,574. G. TRINKLER. Internal combustion motors.
23,315. V. LAMY AND E. CHENAL. Petrol or gas motor.
23,403. J. E. THOMAS AND J. LEE. Seats for motor cars.
24,679. L. I. GIBBS. Running-gear for vehicles.

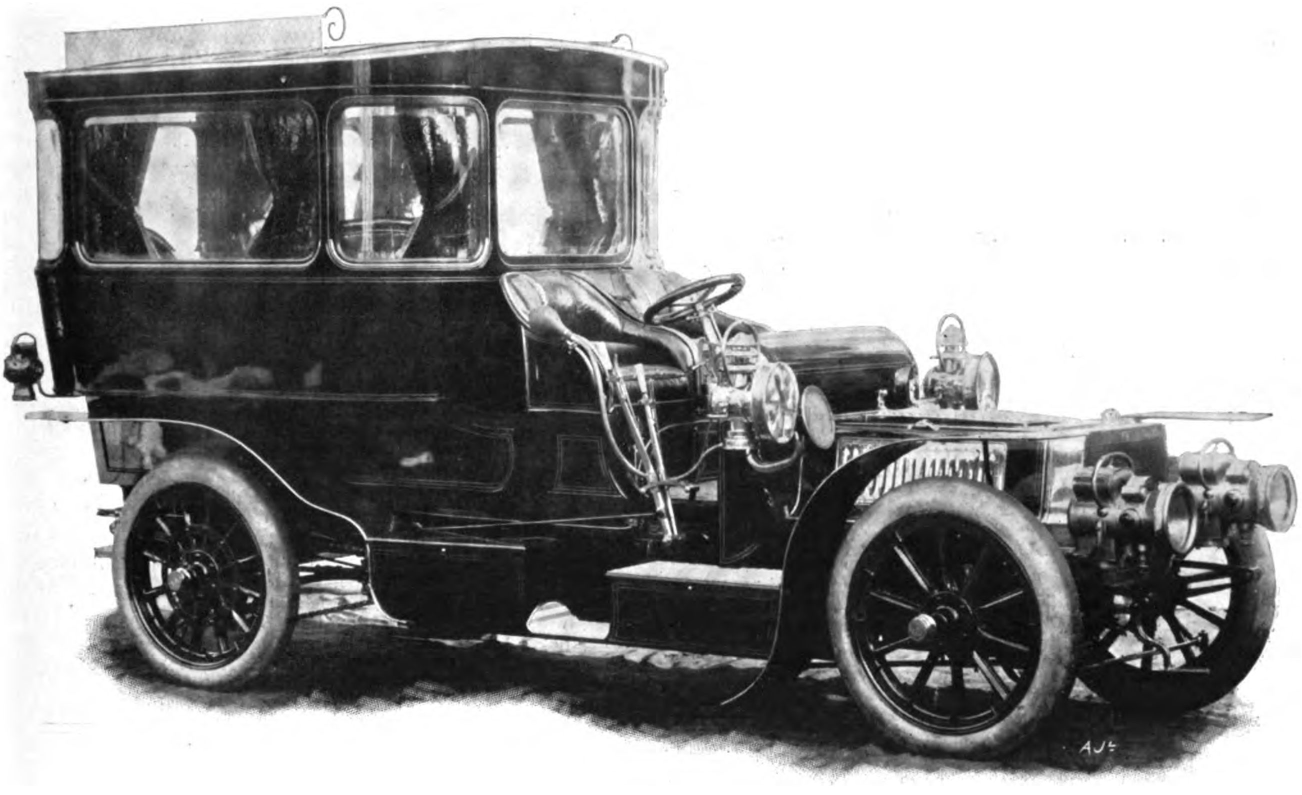
THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

No. 159. (No. 4, Vol. IX.)] JANUARY 23RD, 1904. [Registered at the G.P.O. as a Newspaper.] [Weekly, Price 3d. Post Free, 3½d.



Every year sees an increase in the luxuriousness with which motor vehicles are finished. This is well illustrated by the very elaborate saloon car built by the Motor Manufacturing Company, which attracted considerable attention at the Paris Salon, and which is reproduced above. As will be seen from a view of its interior, which we reproduce on another page, it is very handsomely finished and upholstered, the inner fittings being silver-plated, and the inside top having a ceiling of white Lincrusta; four luxurious arm-chairs form the seats. The curtains are of dark green velvet with silver embroidery and the vehicle is artificially heated. In front, in addition to a clock, a thermometer and barometer are fitted, and an "engine-room telegraph" communicates with the driver. The engine, which has four cylinders and a honeycomb radiator, develops 25-h.p.; the gear gives four speeds, with direct-through-drive on top speed. Both high tension magneto and the ordinary high tension induction-coil ignition are fitted.

THE AUTOMOTOR JOURNAL.

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Telegraphic Address—
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When any difficulty is experienced in procuring the Journal from local newsvendors, intending subscribers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
*Jan. 28 ...	"Railway Companies and the Motor Problem," by Mr. George Montagu, M.P. (A.C. Paper).
Feb. 1 ...	Final Entry Day for British International Cup.
Feb. 1 ...	"Evolution of Road-making in Scotland," by Mr. R. Drummond, C.E. (Scottish A.C.).
Feb. 2–6 ...	Liverpool Cycle and Motor Show (St. George's Hall).
Feb. 3 ...	"Steam Cars for Public Service," by T. Clarkson (Society of Arts).
*Feb. 11 ...	"The British Automobile Industry," by Mr. T. C. Aveling (A. C. Paper).
Feb. 12–24 ...	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
*Feb. 12 ...	Quarterly 100 Miles Trial.
Feb. 23–27 ...	Hull Cycle and Motor Show (Assembly Rooms).
Mar. 4 ...	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
Mar. 25–30 ...	*Side-Slip Trials.
April or May...	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

* Automobile Club of Great Britain and Ireland Events.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Jan. 23–Feb. 4	Brussels Automobile Salon.
Jan. 25–30 ...	Ormond-Daytona Races (Florida).
Jan. 26–30 ...	Philadelphia Show.
Feb.	Tourist Run and Consumption Trial (*L'Auto*).
Feb. 3–6 ...	Paris-Turin Tourist Run (*France Automobile*).
Feb. 6–13 ..	Chicago Show.
Feb. 6–21 ...	Turin Exhibition.
Feb. 14 ...	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Feb. 15–20 ...	Detroit Show.
Feb. 23–27 ...	Anti-Skid Trials at Versailles.
Feb. 29–Mar. 5	Cleveland Show.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 3, 4, 5 ..	Fuel Consumption Trials (*L'Auto*).
Mar. 6–12 ...	Buffalo Show.
Mar. 13–20 ...	Cannes Automobile Week.
Mar. 14–19 ...	Boston Show.
Mar. 15–16 ...	A.C. America Commercial Vehicle Trials.
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Mar. 23–27 ...	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Nice-Rome.
May	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 1–12 ...	A.C. Bordelais Automobile Fortnight.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif.*
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June 7 ...	Namur Week.
June 7 ...	Spa Week.
June 17 ...	Gordon-Bennett Race.
July	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 23–25 ...	Lucerne Motor Boat Races.
Aug. 5–11 ..	Paris-Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 13–14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 15 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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PASSING EVENTS.

The Coming Show at the Crystal Palace.

WE feel no diffidence in prophesying that the Automobile Exhibition to be held at the Crystal Palace from February 12th to the 24th will be much the finest Exhibition of its kind which has ever opened its doors in the British Islands. The promoters, the Society of Motor Manufacturers and Traders, are firmly convinced that in almost every respect it will be the equal of the Paris Salon, while the more spacious and imposing character of the building, the vastly greater convenience and comfort which it affords to visitors, and, above all, the proximity of the spacious grounds which enable all types of automobile on exhibition in the building itself to be shown to intending customers and interested parties in motion under actual working conditions, bestow a unique character on the display which only a show of the kind held at the Crystal Palace can possess. Admirably representative as was the Crystal Palace Exhibition last year, it will be surpassed by the Exhibition of 1904. The space already allotted to exhibitors exceeds that allotted last year by 20 per cent., and upwards of 220 firms, representative of Europe and the United States, will be exhibitors. While all the leading manufacturers who were represented at last year's Show will be found displaying their latest products this year, there will be a considerable number of novelties representing the more recent developments of the automobile industry. Principal amongst these, attention will unquestionably be attracted by the recently perfected agricultural motors, a development which was not in evidence at all at the Exhibition last year, while the growing popularity and reliability of the self-propelled omnibus for public service will be well illustrated by a number of important exhibits. The extent to which the British industry is now catering for that rather mythical personage, "the man of moderate means," will be obvious to all visitors to the Crystal Palace, for never before will have been on exhibition so large a number of such well finished and reliable examples of really cheap motor vehicles, capable of carrying two persons over all ordinary roads, and up practically all the ordinary hills to be encountered, though of course purchasers of such machines must not expect that they will be able to keep pace on steep hills and long up-stretches with high-powered vehicles costing eight and ten times as much.

The extent to which the fair sex is becoming more and more interested in the automobile movement will be well illustrated at the forthcoming Exhibition, as a special day has been set apart for the visit of the Ladies' Automobile Club, who, it is anticipated, will motor to Sydenham from their head-quarters in the West-End, to the number of some 200, on the Tuesday after the Show opens, and will hold a reception in the King's Room. On the other side of the Channel the automobile Salon has been visited every year since its inception by the head of the State. It would, unquestionably, benefit the British industry, and would be signal evidence of the liberality and progressive spirit of which he has on so many occasions shown himself the conspicuous exponent, if King Edward could see his way to following the example of President Loubet, and honouring the coming Exhibition by a State visit.

The importance of the Exhibition can best be realised by a study of the plan of the stands, and the list of exhibitors which has been specially compiled by us, and which we publish in the current issue.

A Curfew for Dogs.

THE Earl of Onslow is always original in his suggestions. To him we owe the association, or perhaps we ought to say dissociation, of the Surrey police from cabbages and market gardens, and the emphasising of the fact that while they are laying traps for motorists, burglars and garden thieves escape undetected. Lord Onslow is both a motorist and an ardent sportsman, and in both capacities has suffered from the annoyance occasioned by the nocturnally wandering dog. In field and cover these nuisances worry sheep and disturb game, and on the high roads after dark they are probably the second worst enemy of the automobilist. So Lord Onslow suggests that the curfew should be re-introduced for the benefit of the vagrant canine population. All dogs wandering after dark who are not embellished with the name and address of their proprietors should, according to Lord Onslow, be promptly apprehended and dealt with according to law. We are inclined to support his proposal in the interests of the dogs themselves not less than in the interests of sportsmen and automobilists. The lot of the wandering dog is seldom a happy one, and his end is likely to be miserable in the extreme if he has a leg broken at night by a passing automobile, the driver of which may be unaware of the occurrence. If Lord Onslow's proposal is ever carried through, we would suggest, at any rate, one proviso—it must be understood that dogs apprehended under the Canine Curfew Law must not be handed over to the tender mercies of schools for physiological research.

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What is in a Name?

SOME of the daily papers have been making merry over the curious coincidence that only the difference of a letter distinguishes Charles Jarrott, one of our ablest high-speed drivers, from Sergeant Jarrett, one of our most notorious motor catchers, and a prominent organiser of police traps on the Ripley Road and thereabouts. Interviews have accordingly been published with both of them with a view of ascertaining their opinions of one another. Mr. Charles Jarrott has often enough driven through Ripley, and observed Sergeant Jarrett on the *qui vive*, though he has never been apprehended by him, and it would seem from the interviews published that the sergeant would be by no means averse to adding his (almost) namesake to his list of captures. Sergeant Jarrett is a popular figure with the farmers and other local ratepayers in the district in which he resides and exercises his functions. In the past year he has added £230, in the shape of fines inflicted on motorists, to the county fund for the reduction of the rates. As the rates are always going up in that neighbourhood this is a cause of popularity, though, as we have often pointed out, it is one which we hope to see removed legislatively in the near future by an enactment which will prevent those who inflict fines from even indirectly benefiting by their infliction. Sergeant Jarrett's views of the functions and utility of the police, and of police traps, are rather amusing. He is firmly convinced, as we know by personal experience, that but for the police action (including, we presume, police traps), the public would have more largely taken the law into its own hands, and emulated the action of Mr. Hosking, butcher, of the village which Sergeant Jarrett adorns, in a wholesale manner. This view—that the public are restrained from acts of persecution and violence by finding accomplices in the police, who worry the objects of their antipathy with the sanction of the law behind them—is distinctly refreshing. We hope that we shall not see it more widely extended in the near future. It would suggest a new method of getting rid of hooliganism. If the authorities could organise a series of onslaughts by police constables on unoffending passers by, in the neighbourhood, say, of Seven Dials or the Borough Road, perhaps the impulses of our hooligans in a similar direction would be satisfied, and we should have fewer outrages. The suggestion is at least worth developing. If Sergeant Jarrett, however, has any real grounds for his views, they show how bitter the hostility to automobilism, during the bad year that has just ended, has been. We are thankful that this hostility is obviously abating.

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The Pedrail—A Revolution in Traction.

We would specially direct the attention of our readers to the articles, the first of which appears in the present number of the Journal, on the Pedrail. The Pedrail, as most of our readers are aware, forms the realisation in practice of a complete revolution in the principles of mechanical traction. The extent of this revolution may be gauged when we say that the Pedrail is a machine that *walks*, and is even capable of *walking upstairs*. We were the first to draw attention to the Pedrail, in our illustrated review of Mr. Diplock's book (Vol. VII. p. 776) dealing with his invention, so that we are glad to be able to have an opportunity of putting before our readers an exhaustive description of the recent developments which Mr. Diplock has made in his invention. So far as can be seen at present, the special province of the Pedrail will be, at any rate in the near future, heavy traction, particularly on bad roads, or even in new countries where there are no roads at all. Its powers of trudging over mere tracks, or even fields and open country where there are no tracks, will probably render the Pedrail of the greatest possible value for military purposes. No one has a keener eye for the possibilities of an invention than Mr. H. G. Wells, and it is significant, consequently, that in his realistic anticipation of the war of the future in "The Land Ironclads," published in the last Christmas number of the *Strand Magazine*, and from which we gave some extracts at the time, he attributes a *rôle* of extreme importance to the application of the Pedrail to military purposes. The Pedrail, when commercially developed, ought also to be specially suitable for collecting agricultural produce from the very fields where it is grown, for it can trudge along lanes and across ploughed ground, and convey it direct to the markets in our big towns.

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Through Desert and Veldt.—A Record of Endurance.

Anyone who wishes to form an adequate idea of what the motor cycle can do in the hands of a determined and capable rider, should betake himself to South Africa, and ask some of the people who were witnesses of the feat, what they think of Silver's 6,000-mile ride. This extraordinary exploit, which consisted in traversing large stretches of the veldt, the Karoo Desert, and the whole of South Africa generally, on a 3-h.p. Quadrant motor bicycle, was accomplished in a period of only two months—September 21st to November 23rd — including a week's rest at Cape Town. The motor car, as we have already chronicled on more than one occasion, has found a permanent and satisfactory footing in South Africa. At the close of the war there was practically not a single motor vehicle in the southern part of the continent. Now they are to be found in all the principal towns, and even as far north as Mafeking and Buluwayo. But the motor cycle had yet to demonstrate its reliability and to win its way. So the Quadrant Company, with commendable enterprise, determined to induce a capable rider to take on a record ride in the Colony. They were wise and fortunate in their choice of Mr. Silver. He served throughout the war in Lord Roberts' bodyguard, and in this country he has done a non-stop run from London to Glasgow, and from John o' Groat's to Land's End. He knew South Africa, particularly the veldt, well, so that one is surprised at his taking on the enterprise so readily, knowing as he did the truly awful difficulties to be encountered. The photographs taken by Silver himself, which illustrate a lengthy description of his exploit, appearing in our contemporary, the *South African Sport and Play*, show the obstacles to the ride in places to have been almost unbelievable. Wildernesses of stones, sand and boulders were encountered and successfully traversed, and across drifts, sometimes filled with loose rocks and sometimes full of water, the machine had to be carried by the plucky rider, sometimes assisted by the aborigines. Altogether, Silver made three rides, in two of which he started from Cape Town and went over most of the spots rendered historical in the late war, including Kimberley, Ladysmith, Elandslaagte, Colenso, and a number of other points, and amongst his numerous interesting photographs is one of the monument erected to Lieutenant Roberts at the spot where he fell at Colenso, and the bridge over the Tugela smashed by the British cannon, and preserved in that condition by the Natal Government as a monument.

There is no doubt from Mr. Silver's experience that the motor bicycle presents advantages, in a wild country like the greater part of South Africa, over any other form of motor vehicle, or, indeed, any other form of locomotion. Certainly many of the tracks, sometimes dignified with the name of roads, that he got through, could not have been attempted by any four-wheeled vehicle. Of course he had his mishaps. He left three complete sets of tyres strewing his path. Once he was run away with down hill, and had to take the side of the road to stop worse disaster, escaping with only a bent front wheel, and once he was overcome with exhaustion, and rescued in the nick of time by one of the South African Police, who poured brandy into the traveller and, ultimately, petrol into his machine. But in spite of these mishaps, rather even on account of them, the performance is a wonderful record of endurance both of man and machine.

It emerges with tolerable clearness from the account of Mr. Silver's tour that the condition of affairs from the automobile point of view is very far from satisfactory in South Africa. Round the towns, such as Cape Town, Bloemfontein, Worcester, and a few others, there are excellent roads. But these oases of civilisation are separated by stretches of veldt and rock-strewn deserts. Before South Africa can become really prosperous its rivers will have to be bridged, and its main points connected by adequate roads. Then it will indeed be a market for motor vehicles. Mr. Silver's account of his experiences shows but too clearly that the peace which has followed the war is of the variety produced by making a solitude. The Romans signalised their conquests by building systems of roads in the conquered territory. The British might follow this classical example in South Africa with advantage.

THE 1904 CHENARD AND WALCKER PETROL CARS.

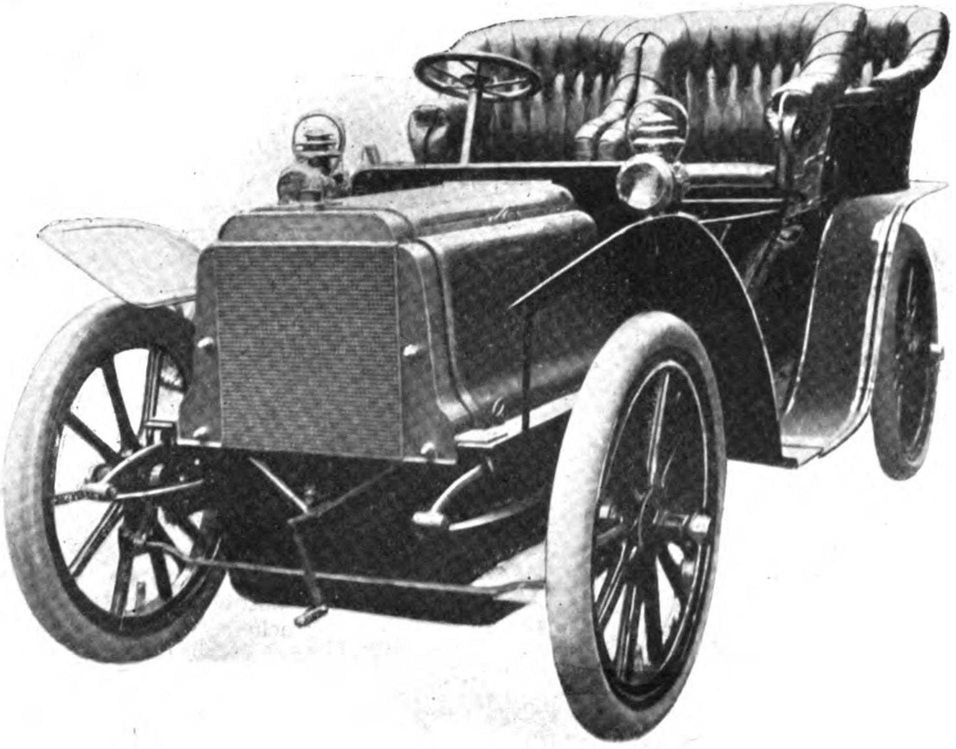


FIG. 1.—An 18-h.p. Chenard and Walcker Petrol Car.

REFERENCE has already been made in our columns to the new vehicles which this very progressive and up-to-date firm—Messrs. Chenard and Walcker—have put on the market this year, and it will be remembered that they are now making 4-cylinder 18-h.p., and twin-cylinder 12-h.p. vehicles, instead of twin-cylinder cars of 10 and 14-h.p., respectively. When visiting the recent Exhibition in Paris, we not only took the opportunity of examining the cars at the Salon, but also paid a visit to the manufacturers' well-equipped works, and had a short practical trial with one of the large new cars. We were, therefore, able to obtain very full particulars concerning these vehicles, and to notice the very thorough manner in which they are built. We were particularly struck in the works with the careful way in which each portion of the mechanism has been studied, and with the amount of experimental work which has been undertaken in the past to arrive at present results. The factory has recently been much enlarged, and has an excellent equipment of up-to-date machine tools for turning out accurate and well-finished work.

The 18-h.p. car has a somewhat similar form of transmission to that employed on the 14-h.p. of last year, the rear wheels being driven through gearing from a differential countershaft mounted on the back axle, but it is arranged in a somewhat different way, and enables the car to be built lower. The 4-cylinder engine, too, is constructed on the same general lines as before, having mechanically-operated inlet-valves arranged so that they can be made to close earlier or later during the suction stroke, by the governor. The combined clutch and brake is also retained, and the engine governor differs only in detail from that of last year. All these leading characteristics of the Chenard and Walcker cars were very fully dealt with in our issues of January 31st, February 7th, and April 11th last, so that we need not again describe them in any great detail. The new features which have been introduced are an automatic carburettor, which maintains a constant degree of richness at all times, a special form of honeycomb radiator, which obviates the necessity for any circulating pump, a high-tension ignition system, which dispenses with tremblers on the coils, a mechanical lubricator for the engine, improved double-acting and compensated side-brakes, a self-aligning connection between the clutch and the change-speed-gear, and a simplified system for controlling the speed of the engine.

One of the 18-h.p. vehicles, fitted with a comfortable tonneau body for five persons, is seen in Fig. 1, and views of portions of the chassis are given in Figs. 2 and 3. Fig. 2 shows the construction of the frame, the gear-box, the fittings on the dash, and the controlling levers and pedals; in Fig. 3 the universally-jointed propeller-shaft and the back axle, with its differential countershaft, are very clearly seen. Fig. 4 is a view of the engine in place in the car, taken from the left side, and in this illustration a portion of the automatic carburettor is shown. An armoured-wood main-frame is used and an underframe of angle section is fixed rigidly to it by side brackets, and by diagonal stays at the back. The underframe carries the engine and the gear-box, beneath both of which is fixed a sheet metal apron, which is easily detachable. The usual semi-elliptic side springs are introduced between the frame and the axles, and those at the rear lie outside the main frame, as in the majority of new cars of large size. Both axles are very substantial solid forgings, which provide long plain bearings for the road wheels. The back-axle, B, is bowed downwards at its centre as seen in Fig. 3, and the casing, A, containing the differential countershaft, is rigidly fixed to it. This countershaft now lies immediately behind the axle instead of above it as formerly, but it drives the rear wheels, by pinions meshing with internal gear-wheels, in just the same way as on the 14-h.p. car of last year. Forked radius rods are fitted at each side between the axle and the frame. The front axle supports the steering heads both above and below the stub axles, and the steering gear is arranged in the usual way. The wheel base is 8 ft. 6 in., the track 4 ft. 6 in., and the wheels are shod with 36-in. pneumatic tyres.

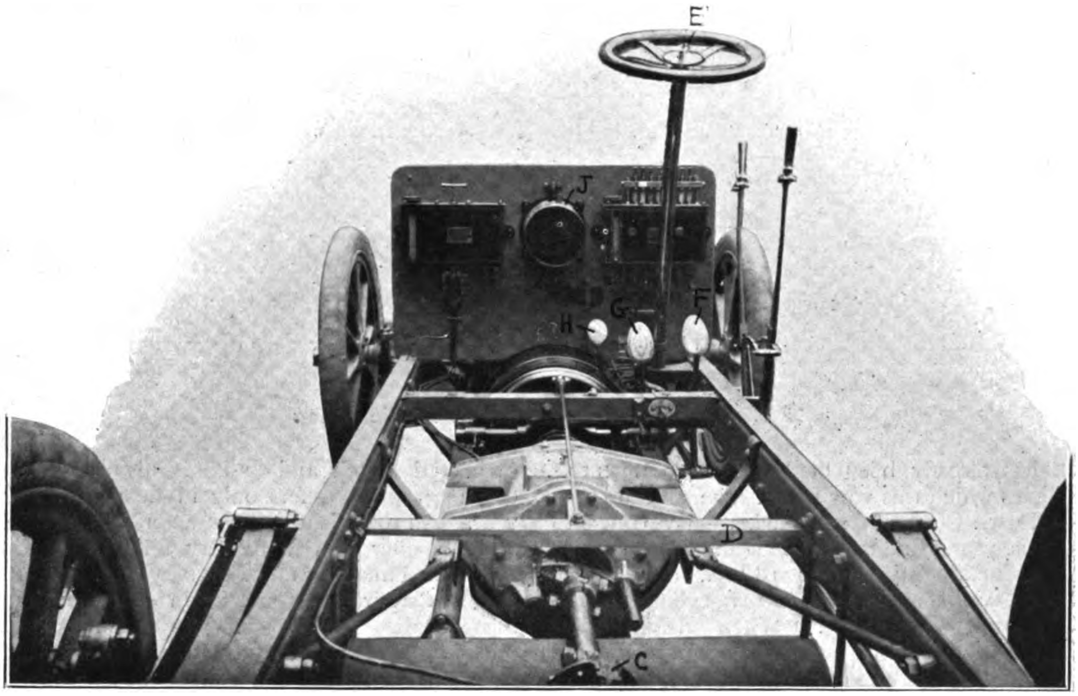


FIG. 2.—The Central Portion of the 18-h.p. Chenard and Walcker Chassis.

crank-chamber, and the gear-wheels, by which they are driven from the crank-shaft, are enclosed in a separate casing on the front end. The inlet-cam-shaft is free to slide longitudinally in its bearings, and is fitted with the special tapered cams described by us a year ago, by which the moment at which the valves are allowed to close is varied. The governor is enclosed in the same casing as the gear-wheels, and is fixed on the crank-shaft. It is connected with the inlet-cam-shaft, and the force of the spring acting against the governor is varied in the same way as before. The normal speed of the engine is now regulated by a small hand-lever, E (Fig. 2), which is mounted above the steering-wheel and moves over a notched quadrant, forming a complete circle. When this lever is placed furthest away from the driver, the speed of the engine is such that the car on the top gear runs at about 20 m.p.h. When placed so as to point towards the driver, the governor maintains the minimum speed at which the engine is capable of running with regularity. The *normal* speed of the car can, therefore, be varied by this lever alone, and in practice it is set in whatever position corresponds with the speed at which the driver wishes to travel. The pedals, F and G, however, are also connected with the governor mechanism, so that, when they are depressed, they slow down the engine before commencing to withdraw the clutch. The pedal, F, also operates the foot-brake, but the pedal, G, does not do so. The former, therefore, is alone required by the skilled driver, and enables him with one foot temporarily to slow down, to disengage the clutch, and to apply the brake. The smaller pedal, H, is also connected with the governor and forms the accelerator pedal; it has the effect of suspending the action of the governor, and therefore enables the driver to increase the speed of the car at any time without changing the position of the hand-lever, E. This method of control is particularly convenient, for it is only necessary to adjust the lever, E, to give the average speed required,

The engine, although nominally of only 18-h.p., develops about 30-h.p. on the brake. It runs at a normal speed of 1,200 revs. per min., but is extremely flexible, owing partly to having a heavy flywheel, largely to the automatic carburettor, and to a great extent through having light reciprocating parts. The cylinders, which have a bore of 100 mm. and a stroke of 130 mm., are cast in pairs, with the inlet-valves on the right, and the exhaust-valves on the left. The valves have flat seats, are made of nickel steel, and are all interchangeable. The inspection covers above them are held down by yokes and nuts, one of each of which serves for each pair of covers. The crank-chamber, which is made of aluminium, is cast in one piece, and the bearings are formed in the cover plates, which are bolted to each end of it. The crank-shaft is supported on bearings at each end only, and is of special construction; it is made of nickel steel, and is carefully balanced. The cam-shafts lie, beneath the valve-spindles, inside the and the driver can either slacken down, stop, or shoot forward without moving his hands off the steering wheel.

The high-tension ignition plugs are fitted into the heads of the cylinders, and the electrical circuit is made to them by chopper switches, mounted upon a heavily insulated support lying above the cylinders. Four coils are used, but they have no tremblers. The primary circuit is completed through each in turn by a simple commutator, J, which is fitted in the centre of the dash, in front of the driver, and is driven by a chain, J^1, from the exhaust-cam-shaft. The coils are contained in a neat box fixed on the right of the dash, and the box contains one trembler, which may be introduced into the primary circuit when starting the engine, or when it is running slowly, for economising current. One 2-way switch is fitted for this purpose, and another for introducing either of the batteries of accumulators. The commutator, J, is mounted so that the time of ignition can be varied, but this is only done in practice when starting the engine. At this time the ignition is retarded, but subsequently the commutator remains in its fully-advanced position. The commutator has a simple contact-pawl instead of a spring blade.

The engine is fed with oil from a mechanical lubricator on the left of the dash, this lubricator being operated by an eccentric from the commutator shaft. In the chassis shown at the Paris Salon, from which our photographs were taken, the mechanical lubricator was fixed to the right on the dash, and another lubricator (for the transmission) on the left, but this mechanical lubricator is now being fitted on the left side and the coil box is placed on the right.

The construction of the honeycomb radiator is shown in Fig. 5, which represents a few of the special tubes of which it is built up. The tubes are made of very thin metal, are formed with a square cross-section at either end, and are deeply corrugated between the squared ends; the ends fit closely together, and are soldered up as shown; the corrugated portions, being smaller in diameter, leave ample water space between them. The dimensions of the radiator, over all, are 20 in. by 24 in. by 4 in. thick, and the effective cooling surface which it offers to the air is about 90 square ft. It is found so efficient in practice that it seldom requires re-filling, and the circulation through it is so ample that no pump is required for keeping the water in motion. A fan is mounted close behind it, and this is driven by a wide flat belt (the tightness of which can be adjusted) from a pulley on the crank-shaft.

The branched induction-pipe on the one side, and the exhaust-pipe fitting, L, on the other side of the engine, are fixed in place by yokes and nuts. The exhaust-pipe fitting, which is visible in Fig. 4, forms two independent passages for the exhaust gases. The one passage connects the two inner cylinders with one exhaust pipe, L^1, and the other leads the gases from cylinders Nos. 1 and 4 to another pipe, L^1; the two pipes join together at the exhaust box in the rear. The exhaust box itself is constructed with two concentric chambers, through both of which the gases pass from end to end. There are no baffles of any kind in the box, but it effectively silences the noise of the exhaust.

The automatic carburettor is shown sectionally in Fig. 6, and a portion of it is visible on the engine in Fig. 4. An ordinary float-feed-chamber, M, is used in conjunction with it, and the petrol flows to this from the tank beneath the front seat by gravity. The upper portion of the mixing chamber, N, communicates direct with the induction pipe, N^1, and the lower portion receives the petrol pipe at N^2. The petrol is led to the jet, N^3, in the usual way, and the main air supply is conducted from the neighbourhood of the hot exhaust pipes, L^1, to the large port, N^5. When the engine is at rest the only passage through the carburettor which is in

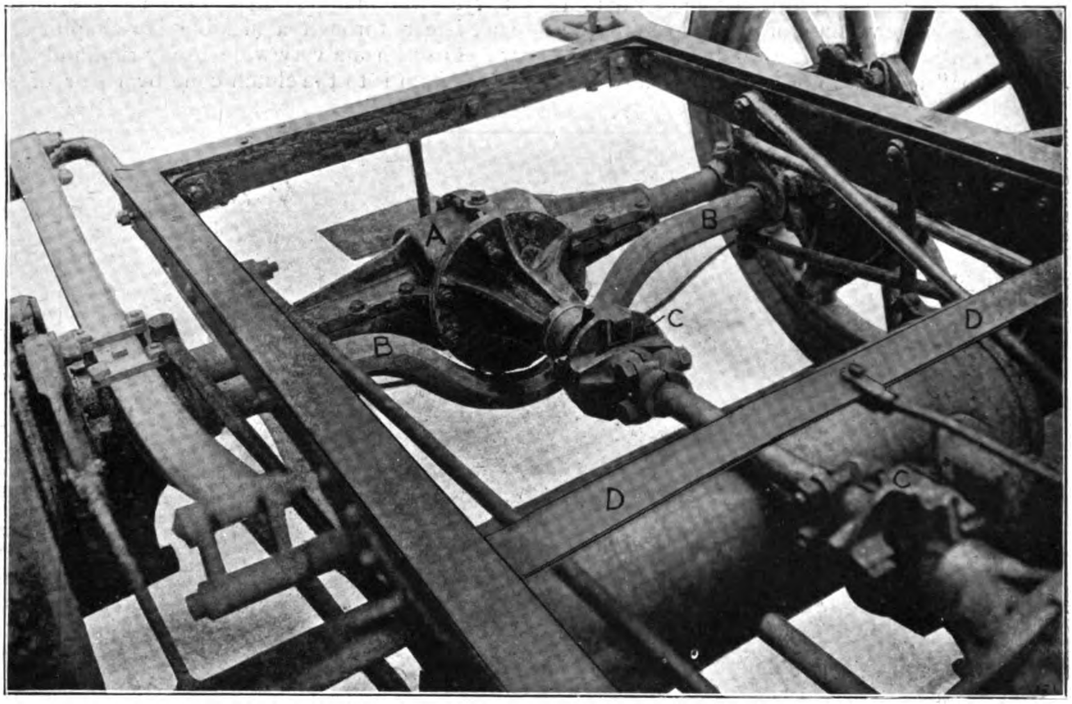


FIG. 3.—Rear Portion of 18-h.p. Chenard and Walcker Chassis, showing the Back Axle, with its Differential Countershaft.

open communication with the atmosphere is through the annular space around the jet, from the induction pipe, N^1, to the main air inlet, N^5. At this time, too, the jet, N^3, is closed by a needle, P^2, which is fixed to a light piston, P, fitting the cylindrical portion of the mixing chamber. The end of this piston is perforated at P^1 to allow the mixture to pass through it, and the piston is normally held down in this position by a spring, P^3, which presses against the cap, N^5. When the engine is started, however, the suction of its pistons causes the small piston, P, to rise against the action of the spring, P^3, and in doing so, this small piston partially withdraws the needle, P^2, from the jet, and at the same time allows auxiliary air to enter through the ports, N^4, just above the jet. The spring, P^3, is sufficiently long to exert an approximately constant pressure upon the piston, P, and the piston therefore tends to maintain a constant degree of vacuum in the induction pipe. The velocity of the air passing the jet, N^3, from beneath is consequently rendered constant, and so its "injector" action upon the petrol also remains the same. The piston, P, rises at all times to an extent which is proportional to the quantity of mixture required by the engine, and in so doing it increases the size of the jet in the same proportion, thus maintaining the same degree of richness of the mixture. The point of the needle, P^2, is tapered to the correct angle to give this result, and it will be seen that variations of engine speed, or variations of cut off by the inlet valves, are ingeniously compensated for to a remarkably complete degree, although the carburettor itself is of very simple construction. The auxiliary air supply can be regulated to a certain extent by a ring, having corresponding holes in it, which encircles these air ports, but this is only a shop adjustment, and does not require attention from the driver. It will be noticed that a washer, P^8, is fitted beneath the small piston, P, the object of this is to render the carburettor silent by preventing the piston from chattering when the engine is running slowly. The small hole, N^4, in the base of the carburettor allows any petrol which may flow out from the jet into the mixing chamber to escape. This carburettor needs no attention of any kind, and is at all times in open communication with the induction pipe without any throttle-valve between it and the inlet-valves.

The main clutch is of the cone type, the inner member of which has cone faces on both sides, the one to engage with the outer clutch member on the flywheel, and the other with a fixed brake ring. The clutch is normally held in engagement by an easily adjusted spring, and after it has been disengaged by the foot-pedal, a further movement brings its other face against the stationary brake-ring, giving a very powerful brake-action. The female cone member is made separate from the flywheel, and is self-aligning in it, the shaft carrying the male member is connected with the change-speed-gear through a flexible jaw-coupling. The flywheel itself has a very wide heavy rim, and the drive is taken from it to the clutch cone by a pair of substantial pins. The change-speed-gear is of the usual sliding spur-wheel type, giving three forward speeds and a reverse, with a direct-through drive on the top speed. The gear-box is rigidly fixed to the underframe, and is a single aluminium casting having end plates (forming the bearings) bolted to it. The lay-shaft lies beneath the direct-through-shaft, and the gear-wheels, which are made of very hard steel, have each alternate tooth cut away shorter than the intermediate teeth, this "staggering" being done in order to render it easier to slide the wheels into mesh with one another. The different speeds are introduced by a simple sliding sleeve, which is operated direct from the change-speed-lever. The lever is fixed somewhat further forward than usual, and is drawn towards the driver to introduce the higher speeds. It is thus more out of the way, when the car is at rest, for getting in and out on the "off" side, and, when placed as far forward as it will go, it introduces the reverse.

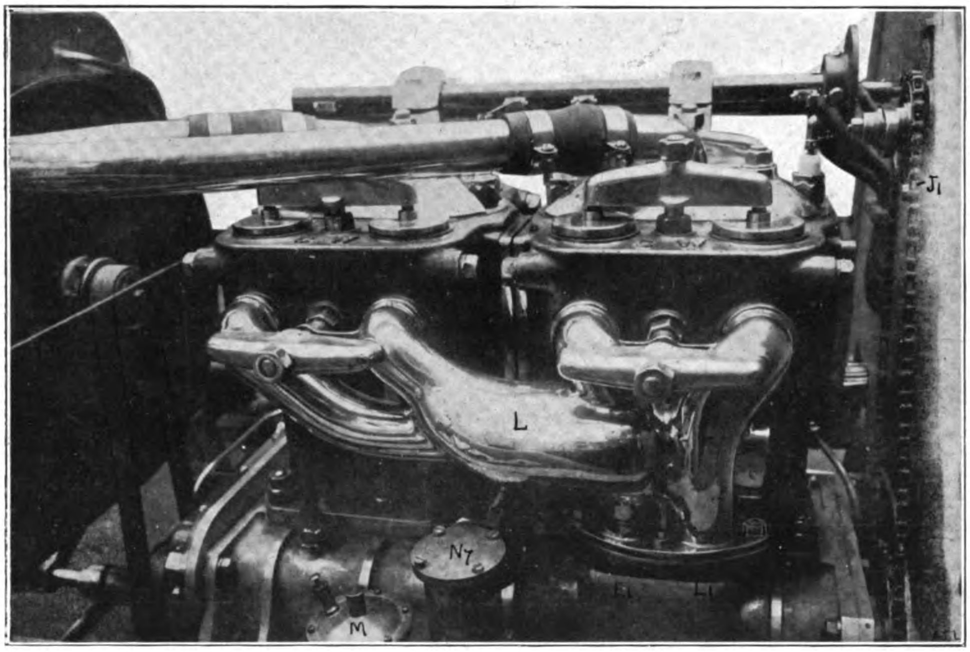


FIG. 4.—View of the Engine in the 18-h.p. Chenard and Walcker Chassis from the left side.

The power is transmitted from the gearing to the countershaft behind the back axle by a propeller-shaft, as seen in Figs. 2 and 3. The universal joints, C, at each end of the shaft are of very simple strong construction, being more like ordinary jaw couplings, with an intermediate loose piece, than ordinary ball-and-socket joints; the jaws are rounded off to the arc of a circle, they give a very positive drive, and the couplings have practically no back-lash.

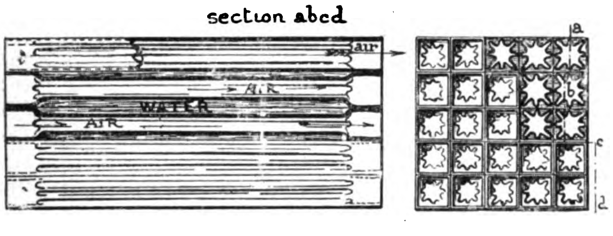


Fig. 5.—The Chenard and Walcker Radiator. Drawings showing a Group of the Corrugated Tubes of which it is constructed.

The hand-brake-lever is connected with the brakes on the rear-wheels through a compensating beam, D, which passes across the car. The brakes themselves are extremely powerful, and have forged steel shoes, which press against the steel drums that form the internal gear-wheels. These brakes are rendered absolutely double-acting, and are so effective that no sprag or equivalent device is fitted on the car.

Neither the hand-lever, E, nor its quadrant are moved by the steering wheel, these being mounted inside the steering pillar, so that they remain stationary.

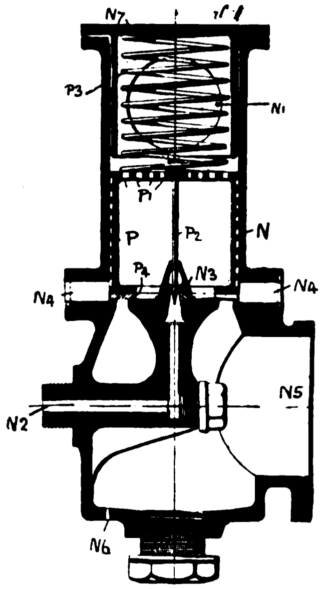


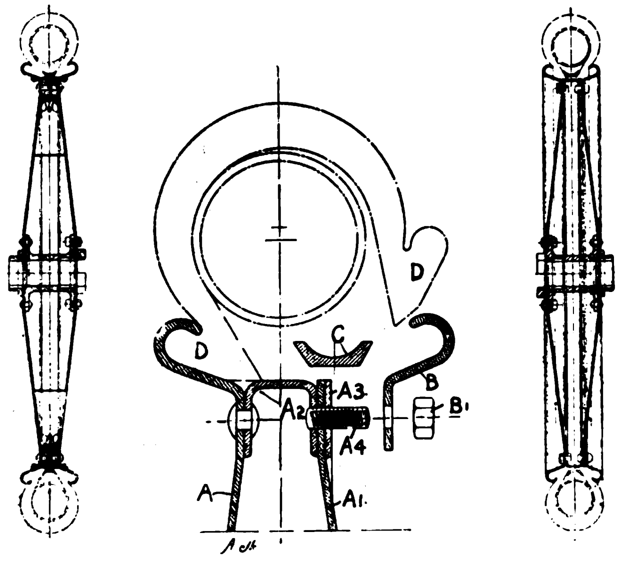
Fig. 6.—The Chenard and Walcker Automatic Carburettor. Vertical Cross-Section through the Mixing Chamber.

The 12-h.p. Chenard and Walcker car is of the chain-driven type, and is similar to the 10-h.p. model of last year. The cylinders have a bore of 100 mm., and the stroke is 130 mm., so that considerably more power is available than on the earlier model. The car has an armoured wood frame, and the underframe carries the engine only. The combined clutch and brake is fitted, and the governor system is the same as on the other cars. The normal speed of the engine is controlled by a lever on the dash, and a separate moderator-pedal is fitted. The cooling water is circulated through a finned radiator, forming the front of the bonnet, by a pump. The gear provides three forward speeds and a reverse, and gives a direct through-drive to the differential counter-shaft on the top speed. The engine is fed with oil from a lubricator, on the dash, in which a pressure is maintained by the exhaust gases. This car has 32 in. wheels.

Samples of the new Chenard and Walcker cars will be shown by the Weston Motor Syndicate, of 14, Mortimer Street, W., who are the sole agents for them in this country and the Colonies, at the Crystal Palace Exhibition next month, when we have no doubt that many of our readers will be glad to avail themselves of the opportunity of seeing the special novel features to which we have referred above.

THE ARBEL STEEL WHEEL.

The "Roue Arbel" is made by the same celebrated French firm who were amongst the first to construct pressed steel frames, and is constructed entirely of steel. It is made in either of the two forms which are shown sectionally, to the left and to the right, in our illustration, the former having its rim fixed rigidly to it, and the latter having a detachable type of rim, as seen on a larger scale in the centre of the same drawing. This wheel is built up of two pressed steel discs, A and A^1, which are riveted with flanged joints to the hub at the centre, and are united at their peripheries by the Ω rim, A^2. In the detachable form, the disc, A, is continued up to form one side of the rim, and the disc, A^1, is reinforced by a ring, A^3, for obtaining a good fixing of the studs, A^4. The detachable side, B, of the rim is held in place by the nuts, B^1, which fit the studs, A^4, and the thickened edges, D, of the tyre cover are held in place by the curved-over sides of the rim. A kind of saddle-shaped ring, C, is provided between the two thickened edges, and this rests on the rim, A^2, to form a curved surface for the inner tube to lie in.



UNIVERSAL TRANSFERABLE STEERING PROPULSOR.

THE rapidly increasing interest in motor boating renders all improvements in the application of the light and handy explosion motor to boat propulsion of considerable general interest. We have pleasure in chronicling the introduction of a very important improvement in this respect. We refer to the Universal Transferable Steering Propulsor, the invention of a French firm, which is being introduced into this country by Messrs. Lockie and Co., of Liverpool. The great advantages of the steering propulsor are that it can be readily applied to any existing boat, and when attached to it converts it to all intents and purposes into a petrol launch without the necessity of boring a hole through the stern post and supplying a permanent propeller shaft and stuffing box. The propulsor can, in fact, be attached to a boat and removed from it without any modification in the boat itself being necessary. Consequently, anyone who has a boat on a lake or river and at the seaside may enjoy all the advantages of two or more motor boats, and will only have to transport the propulsor from place to place. The invention comprises a small petrol motor, which is bolted to a couple of planks spanning the gunwales at the stern of the boat. A prolonged engine shaft, which is enclosed in a metallic casing projecting over the stern, operates a vertical shaft (inside a cylindrical casing) by bevel gearing, which descends below the surface of the water and carries a three-bladed propeller mounted on the end of a short shaft at the bottom of the vertical cylinder, the short propeller shaft being similarly actuated by bevel gearing from the vertical shaft, which is arranged inside the vertical cylinder. The propeller and its shaft can be turned about the vertical axis of the vertical cylinder by means of a hand wheel and bevel gearing, and the boat is steered by varying the angle that the axis of the propeller makes with the keel. A rudder is thus rendered superfluous, and the boat is backed by completely turning round the propeller by the action of the hand wheel after having previously unclutched it from the motor, the clutch being re-engaged when the reverse position has been assumed.

We understand a considerable number of transferable propulsors have been adopted by the navies of France, Russia, Japan, and other countries, while the 12-h.p. propulsor has been successfully applied in canal work, a launch fitted with it having successfully towed a 300-ton barge with a load of 150 tons of sand.

Translators Still Active.

WE really think that the many enterprising French firms who, as the result of extending business in this country find it necessary to publish English editions of their catalogues and descriptions of their machines, would do a great deal better to have the translations prepared on this side of the Channel by persons really conversant both with automobile technicalities *and* the English language. There seems a peculiar fatality attaching to the attempts of the foreigner, however intelligent and conversant with the conversational aspects of the English language, when he comes to describe the intricacies of automobile construction, and the greatest misfortune is that, the nearer the attempts come to hitting the mark, the funnier the failures appear. We would refer to the "remarks" of an enterprising French firm in praise of their machines as an illustration of what we have said above. A few quotations will suffice to entertain our readers:—

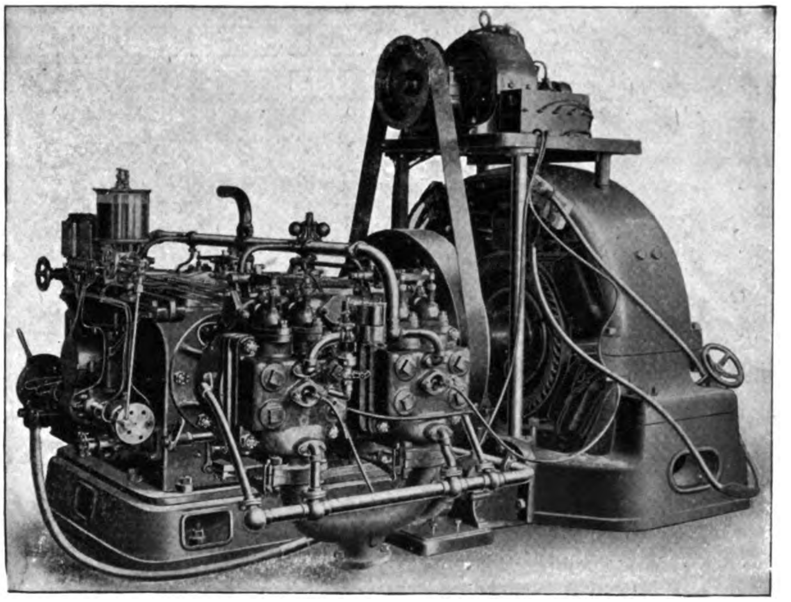
> "Among the chief defects of *other* motors are :—
>
> Very trying trepidations, as much so for the machinery as for the passengers.
>
> A constant series of repairs and upkeep which, in most cases, renders the employment of a skilled mechanic a necessity (valves circulation etc.).
>
> Complications.—Our motor of 6-h.p is a *winged* cylinder of the following dimensions:—0 m. 420 long (16 in 38) by 0 m. 300 diameter (11 in 7).
>
> It has *no external organs, no reglator—nothing.*
>
> Water Circulation.—As this motor does *not heat*, it does not require cooling by means of a stream of water ; owing to the way it is built it does not heat. When the compression takes place, the whole exploding mixture is forced by the pistons into an explosion chamber separated from the cylinder by asbastos joints ; when the detonnating mixture *deflagrates*, the pistons having reached the end of their course no flame penetrates the cylinder.
>
> *Repairs.—Every organ being of a remarkable* simplicity, and, besides being *internally situated* is, by this very fact, out of reach of dust, thus preventing clogging, *and securing a longer life to all the moving organs ; the oil not being scorched does not deposit the well-known special soot on the valves*, a soot which constantly packed by the action of the valves, occupies their bearings and thus causes them to loose the requisite *staunchness.*"

MR. E. S. BRUCE has been giving two lectures to juveniles on Aerial Navigation at the Society of Arts—the final lecture being on the 13th inst. The lectures were well attended and enthusiastically received by an intensely interested audience — for what is there that interests children of all ages more deeply than the eternal problem of flight? Mr. Bruce covered the whole ground of aeronautics from the point of view of actual achievement very thoroughly, from Giffard, Krebs, and Zeppelin to Lebaudy and the Brothers Wright. A warm tribute was paid to the exploits of Santos Dumont, who, it was pointed out, was the first aerial navigator who ever brought an airship back to the starting point against a wind *up to time.* The lectures were rendered specially attractive by the use of the new aerial graphoscope, which shows pictures *in the air* without the need of a screen, and by the exhibition of several working models of flying machines which flew about the building, to the huge delight of the audience.

ALDERMAN SIR H. E. KNIGHT, in evidence before the Royal Commission on London Traffic, has been making some suggestions really worth considering for diminishing the preposterous congestion in the Metropolis. He recognises very naturally that the greater portion of this congestion is due to the delivery of goods arriving originally in most cases by rail. His proposition is that special systems of underground electric tubes should be built connecting the railway depôts with the principal points of the Metropolis, and that goods arriving by rail should be forwarded to these points through the tubes. From there they should be delivered to the addressees by expeditious motor delivery vans. This would certainly tend to largely diminish the extent to which the thoroughfares of the centre of the town are taken up by heavy vans, which, next to the 'buses, are the principal cause of congestion. By the time Alderman Sir H. E. Knight's proposition is realised (if ever) the 'buses will be all motor-driven, and will not be one quarter such nuisances as they are at present.

MOTOR COACHES FOR RAILWAYS.

One railway after another is recognising the advantages attached to the employment of motor coaches actuated by light engines of moderate power for coping with the light traffic on their less important lines. The North-Eastern Railway Company has been experimenting for some time in this direction, and now the Wolseley Company have recently supplied them with a 90-h.p. horizontal engine, coupled to a dynamo for use on a motor-coach. The illustration which we reproduce shows the engine in the Wolseley Company's workshop when being tested, which accounts for the irregular piping and cables shown. The engine consists of four horizontal cylinders overhung on a stoutly built horizontal crank chamber, with inspection covers above and an oil trough underneath it. The valves of the engine are operated from two cam-shafts, one on each side of the engine, driven by special gear from the crank-shaft, and the inlet-valves are mechanically operated. Forced lubrication is used throughout, and the engine is provided with a very efficient silencer. It is governed on the throttle, and gear is provided which enables the driver of the coach to throttle it from either end. The ignition is on the high tension principle, with accumulators, and a specially-designed type of commutator. The total weight of the engine is 35 cwt., and when developing its full horse-power it is said to consume ·78 pints per horse-power hour.



At the normal speed of 400 revs., the engine can develop 92-b.h.p., and when accelerated to 480 revs. gave well over 100-h.p. The dimensions of the cylinders are 8½ inches diameter, and have a 10-inch stroke.

As will be seen from the illustration, the engine, which is provided with a 3-foot flywheel, is direct-coupled to a multipolar Westinghouse dynamo, which has a small dynamo mounted on top belt-driven from the flywheel. The function of this small machine is to charge a battery of accumulators for lighting the coach, start the petrol engine, and provide the exciting current for the main dynamo, which is controlled by rheostats at either end of the coach in charge of the driver. The current from the dynamo is led th[illegible] controllers to motors coupled direct to the two inner axles of the bogeys on which the car runs. A second similar engine is being built by the Wolseley Company for the North-Eastern Railway Company, and will, we understand, be supplied shortly.

The Taff Vale Railway Company have also adopted a handsome steam-driven motor coach for a section of their line running from Cardiff through Penarth to Cadogan. The coach has a general resemblance to a similar vehicle in use on the South-Western Railway, but the boiler of the engine is horizontal, and the engine is mounted underneath the frame between the axles of a bogey. The boiler is of multitubular type, and contains 312 tubes of 1¾ inches diameter. The engine cylinders are 9 inches in diameter with a 14-inch stroke, and are controlled by ordinary eccentrics fitted on the driving axle inside the frame, the link motion being of the Stevenson type, and the engine is reversed by screw reversing gear. Both steam and hand brakes are provided, and the coach, which accommodates forty 3rd-class and twelve 1st-class passengers, is steam heated from the engine on the system introduced by G. D. Peters and Co., of Moorfields. The ordinary steam pressure employed on the engine is 160 lbs. per square inch. The motor coach has been designed throughout by Mr. T. H. Riches, the locomotive engineer to the Company.

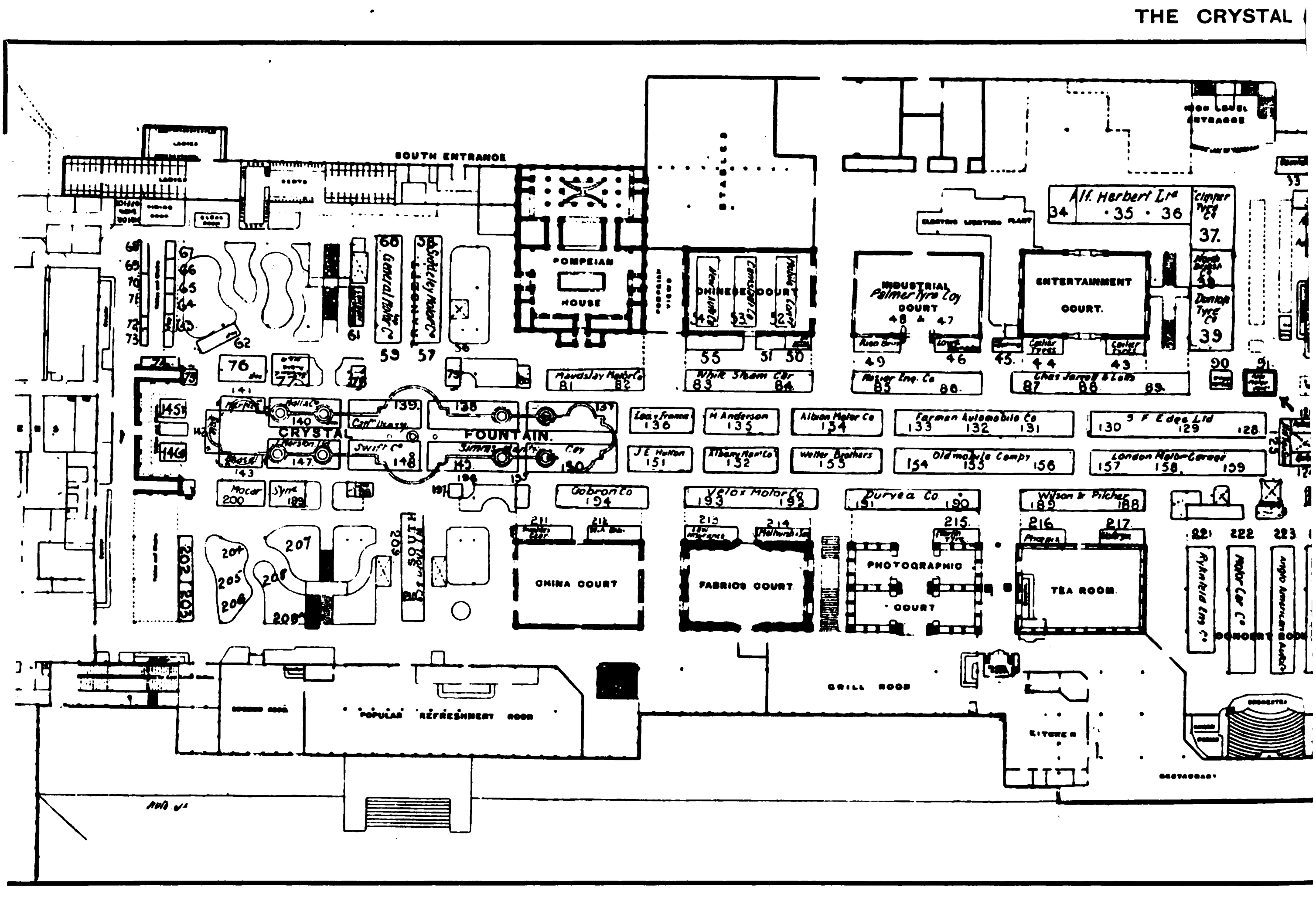
On February 3rd Mr. T. Clarkson will read a Paper at the Society of Arts on "Steam Cars for Public Service," when Lieut.-Col. H. C. L. Holden, R.A., will preside. Professor S. Vernon Boys, F.R.S., on February 10th, will deal with "Thermit," and on February 17th "Garden Cities in their Relation to Industries and Agriculture" will be the subject of a Paper by Mr. A. R. Sennett. During the Session, Mr. Mervyn O'Gorman, M.I.E.E., will read a Paper on "Motor Cars for Popular Use."

The President of the Local Government Board has appointed the following gentlemen to form the Committee (to which we alluded last week) to advise and report in reference to the increase of the tare limit for heavy vehicles:—The Right Hon. Henry Hobhouse, M.P. (chairman), Sir William Arrol, M.P., Mr. H. C. Monro, C.B., Mr. H. H. Law, M.Inst.C.E., Mr. George Deacon, M.Inst.C.E., and Mr. H. Graham Harris, M.Inst.C.E., with Mr. R. J. Simpson, of the Local Government Board, as secretary.

PLAN OF EXHIBITS AT THE SOCIETY OF MOTOR

(The Heavy Vehicle and Marine Sections and Corridor Extension are in the Lower Hall.)

CRYSTAL PALACE, FEB



Acme Lathe Co., 34.
Albany Manufacturing Co., 152.
Albion Motor Car Co., 134.
Alldays & Onions, 107.
Allweather & Co., 267.
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Birmingham Castings Co., 244.
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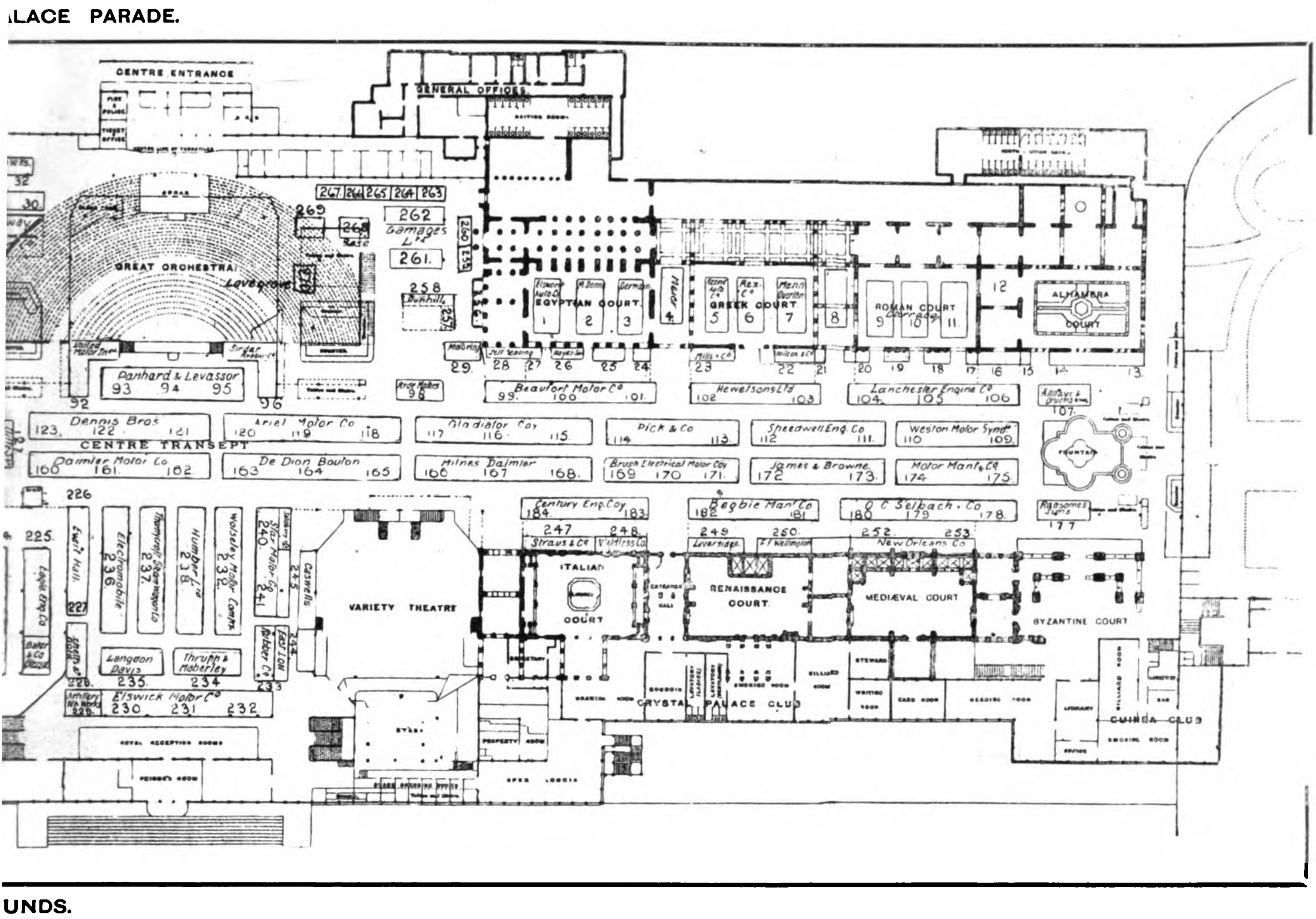
MANUFACTURERS' AND TRADERS' SHOW AT THE
UARY 12th. to 24th, 1904. (The numbers after the names are those allotted to the stands on the plan.)



Langdon Davies Motor Co., 235.
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Standard Motor Co., 77 (and 30 Heavy Vehicle Hall).
Star Motor Co., 240, 241.
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Straker Steam Vehicle Co., 9-12 (Heavy Vehicle Hall).
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Toni Tyre Co., 79.
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Vulcan Motor Co. (Corridor Extension).
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RECENT DEVELOPMENTS OF THE PEDRAIL.

MOST of our regular readers will remember our illustrated review of Mr. Diplock's book on the Pedrail, for this review attracted a considerable amount of attention to his wonderful invention, and has elicited, Mr. Diplock tells us, many enquiries from various parts of the civilised world. The Pedrail System is one which it is a real pleasure to describe, although the actual arrangement of the mechanism is so compact that the task is not an easy one, even with the assistance of the very complete drawings and photographs which Mr. Diplock has been good enough to put at our disposal, and of the photographs which we have ourselves taken. It must not, however, be thought that it is complicated, because this is far from being the case. As we shall hope to show, it comprises the same essential elements which are made use of in other traction systems, although they are arranged in a very different manner in relationship to one another.

The Pedrail has undergone a considerable amount of development during the past year, and, in its latest form, most of the early minor weaknesses—inseparable from any new invention—have been eliminated. Two pairs of wheels, which will be referred to as No. 1 and No. 2, have already been built, and tested in actual practice, and the third pair is now being made. The first pair were substituted for the front wheels of a traction engine, and the second pair, which were designed with such improvements as suggested themselves from the performance of the first pair, were subsequently fitted instead of the rear wheels on the same engine; this engine, with these four Pedrails is seen in Fig. 1. The engine itself was originally constructed for Mr. Diplock on unusual lines, for it is built in such a way that all four wheels are driven, and that the steering gear also acts upon them all. Differential gears are introduced into each axle, and there is also another differential between the two axles. When turning a sharp corner the two wheels on the inner side nearly meet one another, and the two wheels on the other side move a considerable distance away from one another. This arrangement of parts has nothing to do with the Pedrail invention itself, although it can be used in conjunction with Pedrail vehicles, but it is another important feature of Mr. Diplock's traction system and adds materially to the capabilities of any vehicles fitted with it. The third pair of Pedrails is being constructed on the same lines as the working model from which our photographs (Fig. 10) were taken, and are being used instead of the rear wheels on a 5-ton engine which is now nearing completion. The development of the system as shown by these three designs, and the results of the practical tests which have already been made, are not only extremely interesting but are even highly important to those studying the automobile problem. We are therefore glad to be able to show stage by stage what has been done, and to record the reason for each step having been taken. For this purpose we have gone into the matter very carefully with Mr. Diplock, and have to thank him for the courtesy which he has extended to us.

For the benefit of those who do not know the Pedrail system, we propose in the first place to enumerate the chief reasons why it is likely to come into general use, and to explain the principles on which its construction is based. It is well known that the power required to draw a vehicle on rails is enormously less than that which is necessary for propelling one of the same weight along the road, and that the chief reason for this is that in the one case smooth wheels run upon a hard smooth surface, whereas, in the other case the wheels have to roll over an irregular and often soft surface. To consider the question of irregular surfaces first, it is obvious that a wheel is bound either to crush or to ride bodily over any obstacles which may come in its way, and that a considerable amount of power is therefore absorbed in lifting it more or less each time that it does so. The question of hardness of surface may perhaps best be explained by pointing out that the periphery of a wheel theoretically rests upon a hard flat surface along a mathematical line crossing the periphery, but that if the surfaces are insufficiently hard to stand the weight which presses upon the wheel, the wheel has to sink into the surface beneath it until a sufficiently large area on the periphery of the wheel is in contact with the road surface. The wheel, in sinking in to obtain the necessary support, however, must continually plough its way through the ground in front of it as the vehicle is dragged along, and thus the tractive effort required is increased to an enormous extent. For these two reasons, the energy required for hauling a certain weight along a railway is far less than that which is necessary when dragging an equivalent load on ordinary wheels along even the best of roads. Road traction, however, is even more in demand in undeveloped countries where neither railways nor good roads exist to any considerable extent, and it is particularly under such circumstances as these that some new system is required for haulage vehicles of all kinds. Previous attempts to construct suitable vehicles for traversing rough country, and soft ground, have been in the direction of using very large wide wheels—large, to render the relative size of the obstacles slight, and wide, to reduce their tendency to sink in—or of building them in such a way that they lay down rails in front of themselves and lift them up again behind so soon as they have travelled over them. The employment of large wheels can hardly be regarded as a radical cure for the difficulty, because at best it can only result in slight improvement. The other device—that of making a vehicle lay its own track—has met with but little success, and, unless the track which it lays is in itself a large wheel—and therefore open to the same criticism as ordinary wheels, it leads to a prohibitive degree of complication and clumsiness. Mr. Diplock's Pedrail differs entirely from either of these methods, although it does in effect lay a track for itself to travel over. The peculiarity of the system, however, is that a portion of the forward movement of the vehicle results from the rolling of hard wheels over a hard, smooth surface, and that the other portion of the forward movement is a true "walking" action. Every yard that the Pedrail vehicle travels over, the wheels run 27 inches along a rail, and the other nine inches is "walking." This is not an easy idea to absorb at first, but will become clear as we proceed with the details of construction presently.

Neglecting for the moment this "walking" action, it may be said that the Pedrail system is precisely analogous to a railway except that short rails on the vehicle travel along over an endless series of wheels instead of wheels on it rolling over an endless rail. The drawing shown in Fig. 2—although purely diagrammatical, and assuming, as it does, that the wheels are fixed to the ground—will enable us to point out how the "railway" action of the Pedrail takes place, and how the rail is mounted in relationship to the vehicle. The vehicle itself is rigid with a framework, A^1, which has a slot, A^2, cut in it. The steel rail, D, is pivoted at D^1, to a square block which rides in the slot, A^2, the slot forming a kind of horn-plate for the block. This rail is shown in Fig. 2 as though it had a flat face, though its actual shape in practice is that indicated by the dotted line. This portion of the rail is of sufficient length to rest upon either two or upon three of [illegible] wheels, M, which are supposed to be mounted in bearings upon upright supports fixed into the ground. The rail, D, is connected by compression springs, E, with a rocking beam, E^1, which is pivoted to the bracket, A^1, and cushion springs, E^3, are also introduced between the beam and the bracket, A^1, to tend to keep it and the rail in a horizontal position. It will thus be seen that the rail, D, is fixed to the vehicle in much the same way that the axle-boxes are fitted to an ordinary railway truck, but that it can rock about the pivot, D^1, so that it can always rest on at least two of the wheels, M, however irregularly they may be laid. If now the vehicle were being hauled along, it would run in exactly the same way that a truck runs along the line, and it would be equally efficiently suspended upon springs.

Assuming, however, that the vehicle were fitted with self-propelling mechanism, and that the axle, B, were driven by the engine, then the necessary propulsion can be obtained by fitting the axle, B, with radial arms, F, as shown, and providing these arms with pins, F^4, which would press against the wheels, M, and so force the rail, D, along over the wheels, M. It will be noticed that the pins, F^4, can slide up and down as they have to do owing to their circular path, or when the springs, E and E^3, come into action.

In actual practice, however, the wheels, M, instead of being fixed to the ground, are laid down in front of the rail, D, by the vehicle itself, and are lifted up again as soon as the rail has run over them. For this purpose they are mounted upon radial spokes, which are free to slide in and out, and have large flat supports (or feet) attached by universal joints to their extreme outer ends. The spokes slide in guides formed in discs which are mounted on bearings rigid with the vehicle, and it is these discs which are driven by the engine if the vehicle is self-propelled. The discs then serve the same purpose as the arms, F, in Fig. 2, besides supporting the wheels and their spokes, and rendering them endless. The feet on the ends of the spokes are not only attached to them by universal joints forming ankles, but the sockets for these joints are attached to the feet themselves in such a way that they are free to move in a horizontal plane inside them.

The "walking" action, to which we have referred, arises from the arrangement of the spokes in the manner which we have just described. The under surface of the rail, D, is so shaped that three feet can rest on the road at the same time, and, therefore, each foot comes into contact with the ground in advance of the centre of the Pedrail. Whilst the rail is sliding over its roller, the foot to which it is attached remains in the same position on the road, and, as the vehicle passes along, the spoke turns on the universal joint forming the ankle in much the same way that an animal walks.

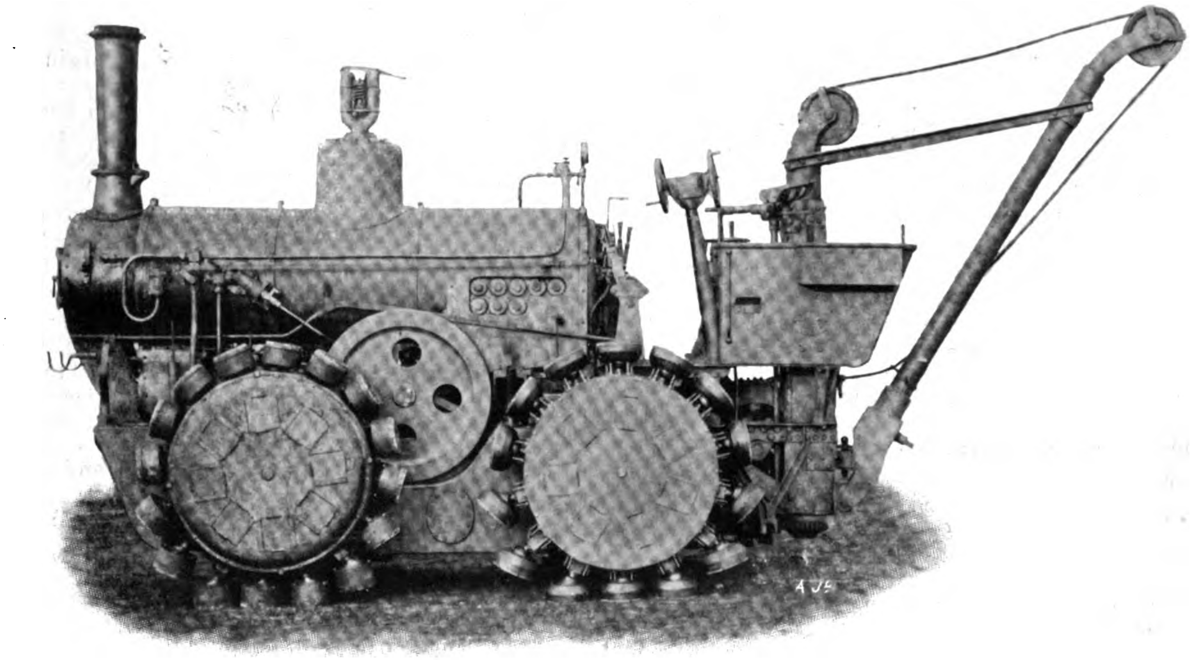


Fig 1.—The Diplock Experimental Traction Engine, on which all four wheels are driven, and are used for steering, fitted with a pair of No. 1 Pedrails in front, and a pair of No. 2 Pedrails behind.

Reference to the accompanying illustrations will show the arrangement of parts in all three of Mr. Diplock's Pedrail designs. The No. 1 type is shown complete in Fig. 3 only, and the No. 2 design in Figs. 4 and 5. The front view of No. 2, however, is to all intents and purposes applicable to No. 1, and these three figures have, therefore, been arranged together. No. 3 Pedrail is illustrated in Figs. 6, 7, and 8, and a detail drawing, showing the spokes with their guides, in Fig. 9. Fig. 10 shows a working model of the No. 3 design, which has been built for Mr. Diplock by Mr. Henry Gore, of Wenlock Street, New North Road, N., and is seen in six different positions demonstrating the extraordinary

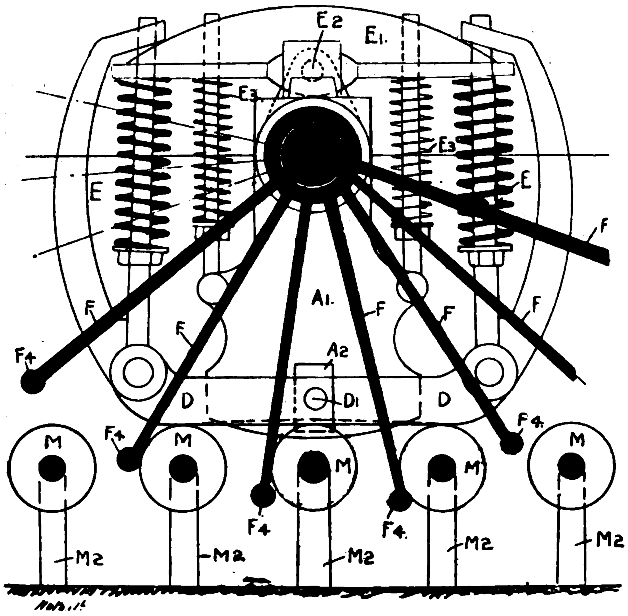


FIG. 2.—Diagrammatic Drawing illustrating the chief principle of the Pedrail.

manner in which this mechanism can surmount obstacles in its path. In the three designs, the different forms of construction which the feet have undergone are particularly interesting, and these are shown for all three models in Figs. 11 to 15 inclusive, after which we have arranged the drawings of the dust-proof casings above the feet on No. 2 and No. 3 in Figs. 16 and 17. Fig. 18 shows an important improvement on the No. 3 design, and Fig. 19 represents the engine which is now in course of construction.

The essential characteristics of the Pedrail in all cases are that the bracket, A^1 (Figs. 3, 4, 5, 6, 7 and 8) is rigidly fixed to the vehicle; that the peculiarly shaped rail, D, is pivoted at D^1 to a square block which rides in a slot, A^2, in this bracket; that this rail is steadied by compression-springs, E, to a beam, E^1, which is pivoted at E^2 to the bracket, A^1; that sliding spokes, G, arranged radially are mounted so as to be free to slide in guides formed in discs, F, which can turn about the axle; that these spokes are normally drawn inward in their guides by springs, J, and that they carry small wheels or rollers, M, which engage with the rail, D, and form supports for it to rest upon; that these spokes have flat feet, K, mounted on universal joints (or ankles) at their extreme ends, so that the feet rest flat upon the ground when they come in contact with it; and that the spokes can continue to move round without straining the feet or tending to move them while the feet still rest upon the ground.

In No. 1 and No. 2 Pedrails, a live axle, B, is arranged, and the engine drives a differential sleeve, B^1, which is keyed at B^2 to the driving disc, F. In No. 3 design, however, the axle, C, is stationary, and this is fixed to the sleeve, A, which is secured to the bracket, A^1, by the set-screws, C^1. This bracket, A^1, is in Figs. 3, 4 and 5 fixed rigidly to the stationary sleeve which encloses the axle, B, and the sleeve, B^1. In Figs. 6, 7 and 8, two discs, F, are used instead of one, and these revolve on bushes, F^1, outside the stationary sleeve, A.

In all cases the bracket, A^1, has a large slot, A^2, cut in it to act as a horn-plate for a square block carrying the pin, D^1, to which the rail, D, is fulcrumed, and, at its upper end, the bracket receives the pivoted (at E^2) beam, E^1, between which and the rail, D, the compression springs, E, are fitted. The rail, D, and the beam, E^1, are thus free to rock about their pivots, with a parallel motion between them, and, as arranged in Fig 4, the springs, E, remain equally compressed when they do so. These springs, therefore, take the weight of the vehicle on the rail, D, and allow for the necessary up and down motion between these two parts. In Fig. 4, cushion-springs, E^3, are introduced between the bracket,

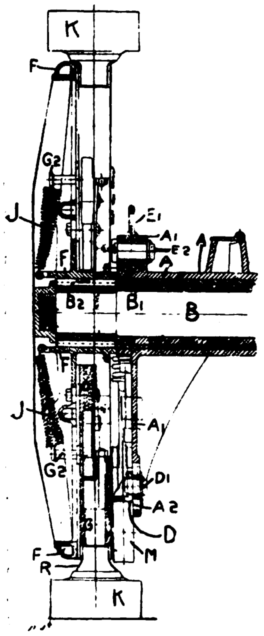


FIG. 3.—Vertical Transverse Section of No. 1 Pedrail.

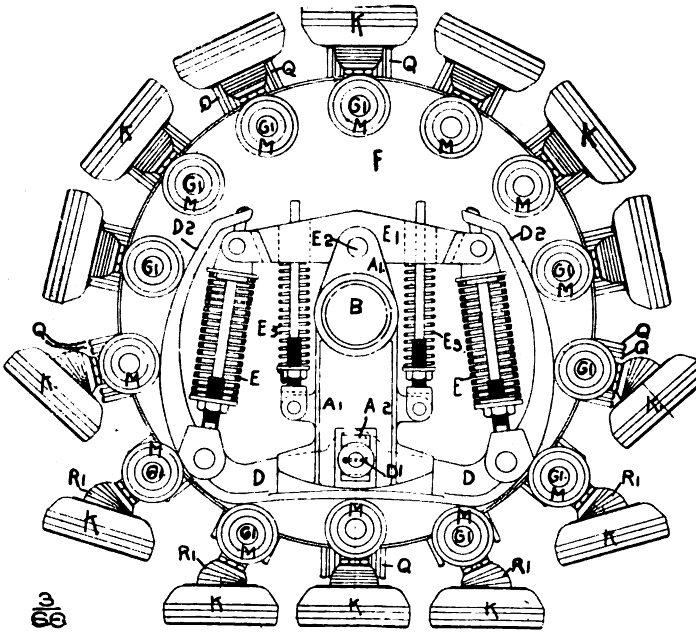


FIG. 4.—Elevation of No. 2 Pedrail, showing arrangement of Rail, Rollers, and Feet.

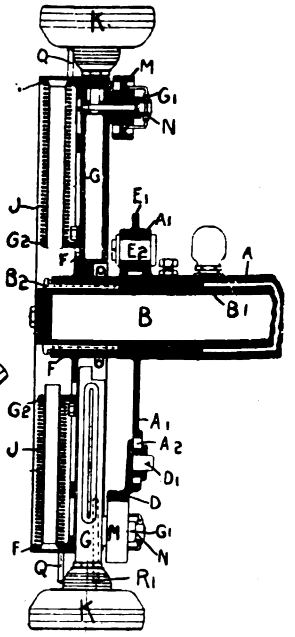
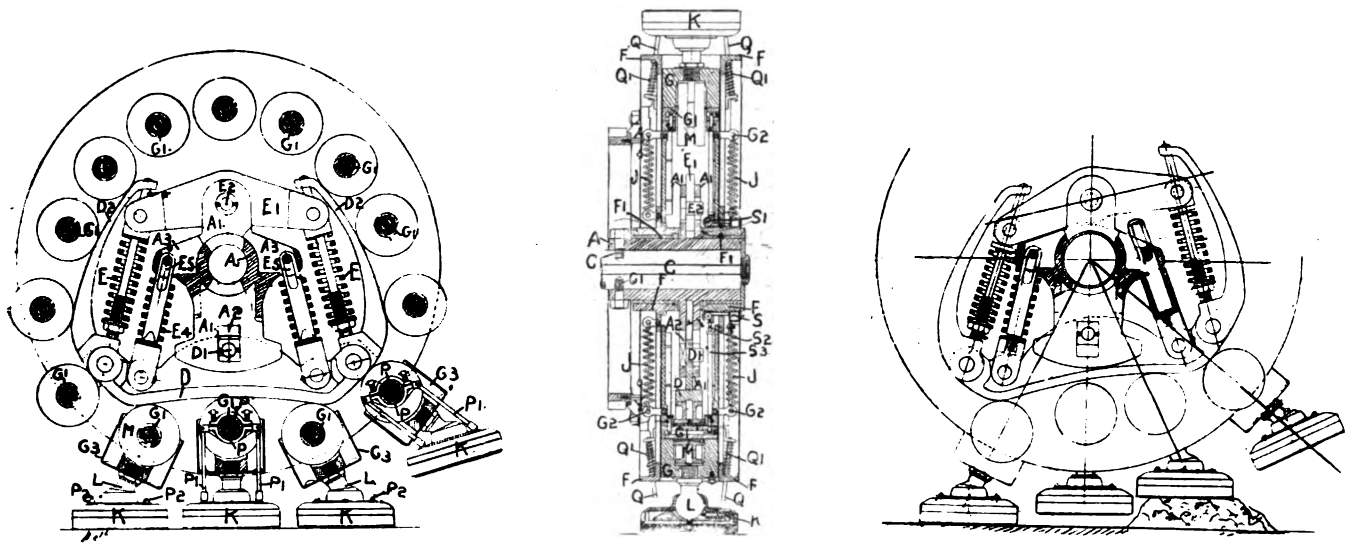


FIG. 5.—Vertical Transverse Section of No. 2 Pedrail.



Figs. 6, 7, and 8.—The No. 3 Pedrail, showing the central arrangement of the rail with its compound leverage-springs, and the latest improvements which have been made by Mr. Diplock.

A^1, and the beam, E^1, these springs tending to keep the beam and the rail horizontal, and preventing them from tipping suddenly over from one inclination to the other. In Figs. 6 and 8, however, it will be noticed that these cushion-springs are arranged in an entirely different manner, although they serve the same purpose. This new design, to which we shall only refer briefly for the moment; is particularly ingenious, and has the effect of changing the fulcrum of the rail, D, from the pivot, D^1, to the lower end of one of the links about which the springs, E^4, are fitted. The links are pivoted to the rail, D, and have slotted upper ends which ride upon pins fixed to the projections, A^3, of the bracket, A^1. A peculiar compound-lever-action is obtained when the rail is rocked over, as seen in Fig. 8, for it will be noticed that one of the springs, E^4, then takes part of the load, and that the springs, E, divide the remainder between them. The original object of arranging the springs in this way was to enable the inventor to fit the rail, D, centrally inside the Pedrail, with the guides, H, on both sides of it, and with springs, J, on both sides also.

The rail, D, is curved on its underside in such a way that three of the rollers, M, will remain in contact with it at the same time, if their feet are resting upon a level road. It is carried up at each end, in the shape shown, to act as sloping guide-surfaces, D^2, which, with a cam action, allow the rollers, M, to come gently and gradually into contact with it before these surfaces force them outward against the action of the springs, J, to bring their feet into contact with the road at the required time—in advance of the axle. It will of course be clearly understood that the rail, D, is pivoted so as to render it self-aligning on the rollers, M, by enabling it to assume a position parallel with those portions of the surface of the road on which the feet actually rest, thus compelling it to bear equally on at least two of the rollers at all times.

The spokes, G, are mounted in radial guides, formed in the discs, F, and these spokes carry the rollers, M, upon bearings formed by the pins, G^1, and bushes, M^1, The spokes are normally held in towards the centre of the Pedrail by the springs, J, which are attached to the spokes by brackets, G^2. In the No. 1 and No. 2 designs a single disc was used for the spokes, the springs, J, being mounted on one side, and the rollers, M, on the other, which, although a convenient arrangement because it enabled the rail, D, to be fitted outside the revolving portion of the mechanism, yet resulted in bad strains being imposed on the spokes and their guides, owing to the strains being put on overhung portions. In the No. 3 design, therefore, two discs, F, are used, and the rail, D, with its stationary bracket, A^1, lies in between them. Each of the discs is mounted on the sleeve, A, and the two are connected together at intervals around the periphery by blocks, F^2, as seen in Fig. 9, which shows the arrangement of the spokes, G, and their guides, H, sectionally. The rail is, in this case, a double one, and the roller is also grooved out centrally so that it practically forms two rollers at a short distance apart. In this case the springs, J, are also arranged on each side of the spoke, so that no side strain is imposed either by them or by the rail. The springs are enclosed by light casings, as indicated in Fig. 7, although

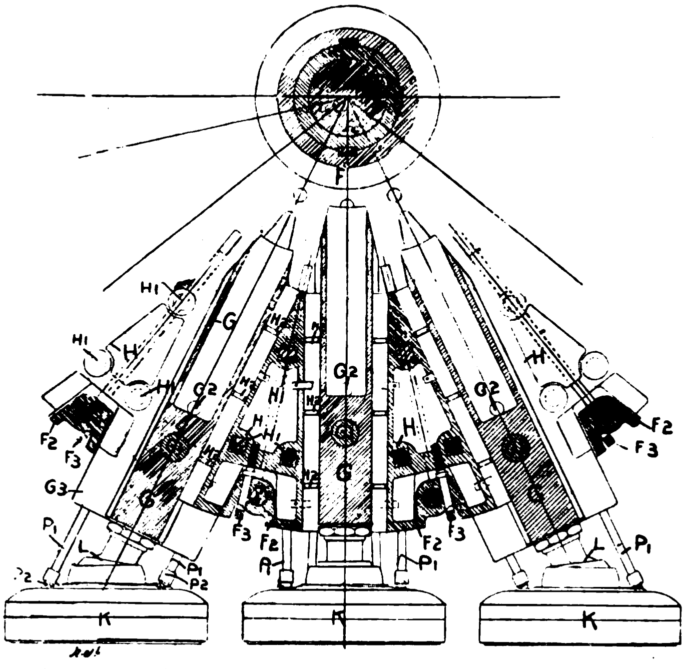


Fig. 9.—Sectional drawing showing the arrangement of the spokes and the guides in the driving discs on No. 3 Pedrail.

they have been removed on the model (Fig. 10) to expose the springs to view. The heavy friction on the sliding spokes in No. 1 led to the substitution of reciprocating ball bearings before construction, but the overhang rendered these unsatisfactory. In the No. 2 design, the bearings were considerably improved, but the objectionable overhanging still remained. In the new design very large bearing surfaces are obtained, as seen in Fig. 9, and these are rendered adjustable to take up wear. Four semi-circular grooves are cut on the sides of the spokes, and these slide on circular "bolsters," which are fixed to the V-shaped blocks, H, the blocks being bolted to the discs, F, on either side. The V blocks can move radially, when not locked by the bolts, for the bolts pass through slots in the discs, and the blocks can be forced inward or outward by the feed-screws, F^3, which are fitted through the blocks, F^2, between the discs, F. The "bolsters" have grooves, H^2, cut in them, so that any dust which may find its way on to them is ejected. It will be understood that the spokes serve the purpose of laying an endless series of rollers beneath the rail, D, whether the Pedrail is fitted to a self-propelled vehicle or merely to a trailer, but that in the former case they also act as levers which obtain a grip of the ground at their extreme ends, and are pressed up against, by the discs, F, in such a way as to propel the vehicle forward. It should, perhaps, be mentioned here, that the Pedrail shown sectionally in Fig. 7 is intended to be driven by a gear-wheel fixed to the inner face of the inner disc, F, as seen in that drawing.

(*To be continued.*)

THERE has been a curious reticence on the part of the Brothers Wright in regard to the full details of their sensational exploits with their aeroplane equipped with a petrol motor. The general public is inclined in consequence either to jump to the conclusion that there has been considerable exaggeration, or that the Brothers Wright are lying low with a view to astonishing the world at the St. Louis Exhibition or on some other occasion in the future. If we may credit a communication which is said by our contemporary, *L'Auto*, to have been received by Capt. Ferber. a French aeronaut of repute, from Mr. Chanute, the former explanation appears to be the more correct. According to our contemporary's account of Mr. Chanute's communication, the Brothers Wright did accomplish free independent flight, but for nothing like the distance of 3 miles at one stretch. The maximum distance covered in one single free flight was 266 metres against a considerable wind, the aeroplane remaining 59 seconds in the air. Its total weight was 338·61 kilogs., with a surface of 47·3 metres, the length of the wings from tip to tip being 12·19 metres. The power of the motor driving the propeller was 12-h.p. The aeroplane was first mounted on a wheel carriage and run down a bluff with a small incline to get up speed. What is of importance, however, and almost consoles us for finding that the distance actually traversed was less than we supposed, is that similar results were obtained on four consecutive occasions, four independent flights of approximately the same length having been successfully executed. To be able to do this shows most convincingly that the Wright Brothers are on the way to attain as complete a mastery of the motor-driven aeroplane as they have already attained of the simple gliding machine with which they have accomplished such unequalled results.

CLUB DOINGS.

Derby and District Automobile Club.—The second annual meeting of this club took place last week, when Mr. Maurice Hunter, in the absence of Mr. G. A. Strutt, occupied the chair, and amongst a large gathering of members present were Mr. A. Ottewell, J.P., Drs. Vaudrey, Arundel, Copestake, Howarth, Messrs. Mell and Reading, Clark, Fletcher, Sayer, Porter, C. T. Leech (Hon. Treasurer), and C. J. Allin (Hon. Secretary). The club, which started with 15 car owners only, now has the substantial roll of over 70 members. In regard to the present season it was announced that a fixture card is being arranged, the club having already received a number of important invitations.

A challenge cup is being instituted by the club which will be allotted annually to the member who obtains most marks in a series of competitions to be held. These competitions will consist of hill-climbs, skill in driving and avoiding obstacles, non-stop runs, &c.—contests which are calculated to bring out the best points of a car irrespective of its size. Medals will be given for each separate contest, and in addition Mr. Strutt has also offered an extra personal prize to be won right out.

The balance sheet, presented by the Hon. Treasurer, showed a very satisfactory surplus on the right side, and the following officers for the present year were elected:—President, Mr. G. A. Strutt; Vice-Presidents, Messrs Maurice Hunter (Belper), Frank Lawson (Foremark), C. L. Schwind (Broomfield), Dr. E. Vaudrey, J. A. Arnold, J.P., A. J. Clay (Burton), T. Henderson Pounds, G. F. Smith, H. H. Raphael (Allestree), J. Gretton (Stapleford Park), F. A. Bolton, J.P. (Oakamoor), and Charles R. Crompton (Stanton). The Committee consists of Messrs. Arundel, Collumbell, Copestake, Guest, Mell, Sale, St. John, and F. Smith. Mr. C. T. Leech continues to act as Treasurer, and Mr. C. J. Allin as Secretary.

It was decided that a club room should be obtained as soon as possible, so that members might leave their cars while in town, and the club would have a permanent home for meetings, &c.

It is satisfactory to note that the recommendations of the Derbyshire County Council, in which it is recommended that no 10-mile limit should be applied for in the district, have been adopted at the County Council meeting held last week, although slight opposition was offered on the part of one or two members who would have been glad to have seen a limit imposed on automobilists. Mr. B. Waddington even objected to the suggestion that it would be necessary that warning signs should be erected at the expense of the county, as he affirmed that "the law presumed that everybody knew the law."

Hartlepools Automobile Club.—It has been determined to form a club for the Hartlepool District, with headquarters at the Grand Hotel, West Hartlepool. About 30 members have already decided to join, and Mr. G. Jones has been elected President, whilst Dr. F. H. Morrison and Mr. J. R. Fothergill have been appointed Vice-Presidents. Mr. C. C. Brown is acting as Honorary Secretary.

Nottingham and District Automobile Club.—This club may claim to have been the first to inaugurate an "Automobile Ball" in Great Britain, as, under their auspices, an extremely successful dance took place, on the 15th instant, at the Victoria Station Hotel, Nottingham. No doubt this new departure will be followed in other districts, and in time the county "Automobile Ball" will be as familiar an institution as the "Hunt Ball." An enormous amount of hard work was done by those who undertook the organisation, and the Hon. Secretaries, Mesrs. W. D. Wells and R. Harbidge, who acted as M.C.s, were ably assisted by a number of stewards, including:—Messrs. H. Belcher, R. Sutton Clifford, jun., B. Winter, H. Bowden, A. Ward, P. Huskinson, J. D. Morrish, and R. Cripps.

Sheffield Automobile Club.—The last meeting of this Club was signalised by the reading of an interesting and instructive Paper on "Ignition and Electrical Matters Appertaining to the Motor Vehicle," by Mr. S. E. Fedden, the General Manager of the Sheffield Corporation Electric Light Department. Mr. E. F. Coupe, was in the chair, and a large and representative assemblage of members and their friends attended to hear the paper read.

Mr. Fedden's Paper, which was admittedly elementary in character, was designed primarily to make the principles involved in electric ignition of motor vehicles comprehensible to such automobilists as do not happen to have previously had any acquaintance with electricity. Mr. Fedden accordingly commenced his paper with an outline of the elementary notions which are indispensable to the comprehension of electric phenomena, which he put before his hearers with singular lucidity and wealth of illustration. Mr. Fedden then proceeded to explain the elementary principles of the induction coil, and described the Benz high-tension ignition and method of connecting the induction coil up to the cylinder of a petrol engine. Mr. Fedden also described in the course of his paper the principles on which accumulators are constructed, how they are used for operating induction coils, and the best methods of charging them, and incidentally gave a general outline of the principles involved in the construction of a simple form of dynamo. A very valuable feature of Mr. Fedden's paper was a sort of appendix with which it concluded, dealing with the "faults" of ignition apparatus on cars, which was designed and will doubtless have the effect of putting his hearers in the position to remedy any defects that may arise in this part of their car equipment with the greatest possible expedition. Mr. Fedden has been struck by the amount of annoyance occasionally arising to car owners by persons meddling with their vehicles while left unattended, and he has designed a simple invention to reduce this cause of annoyance to a minimum. He mounts a small induction coil on the car, connecting one of its secondary terminals to the metal framework of the vehicle, earthing the other by means of a few yards of wire terminating in an ordinary meat skewer stuck into the earth. As the body of the car is ordinarily insulated by the pneumatic tyres, a meddlesome small boy who begins to fiddle has a period put to his further investigations by experiencing a well-merited electric shock.

After the reading of his paper, Mr. Fedden was tendered a vote of thanks, and a presentation was made to Mr. J. R. Wade, the Secretary of the club, of a watch in recognition of his services. The proceedings concluded by the distribution of certificates for the club's 40 Miles Non-stop Motor Cycle Run.

The Scottish Automobile Club (Western Section).—A meeting of the club was held in the Windsor Hotel, Glasgow, on the evening of Monday last, the 18th inst., Mr. John Adam, of Larchgrove, presiding, supported by the Marquis of Ailsa, Mr. Edward Brook, Younger of Hoddam, Mr. Jas. Weir, Mr. A. R. Brown, Mr. Hugh Reid, Mr. H. M. Napier, and other prominent automobilists. There was a large attendance, over 100 gentlemen being present.

Mr. Charles Jarrott read an extremely amusing and entertaining Paper upon his reminiscences of the road. From his great store of experiences Mr. Jarrott selected some of the more striking incidents with telling effect, and remarked that in the pleasure which always lies in remembrance of the past, the toil of motoring in the early days, when it was toil indeed compared with the luxuriousness of the present day, we were apt to forget past hardships, and in recalling the events remember only the experiences which gave us pleasure, and if perchance an unpleasant memory forced itself upon us, we passed it over as being part of the game. The main features of the paper have already been given by Mr. Jarrott in London, at the Automobile Club, but several new points were brought out during his present discourse. Passing over quite the earliest days, he recalled his great envy of Henri Fournier when he witnessed him riding through the Bois de Boulogne on a huge motor bicycle propelled by a little air-cooled De Dion motor. He so coveted this machine that, after lengthy negotiations, he eventually became its possessor; and, by way of his first trip on it, he selected the Strand, in London, for an experiment. Even now he marvelled how he avoided killing himself during his run through London. Some idea of the weight of the machine might be obtained from the fact that it required two persons to hold it while it was started. This identical machine he used on a run to Brighton, and when in an exhausted condition from pushing it uphill, the machine fell on him, he was unable to raise the weight off his body, and had to wait until he was rescued by some passers-by. He recalled winning the first motor bicycle race which was held in England at Sheen House, when his time was 2 min. 8 sec. for the mile, it being commented on in the papers as a marvellous performance. His next venture was a De Dion tricycle, which under no circumstances could do more than 20 miles an hour—which, as a matter of fact, was a remarkable performance considering the smallness of the motor. His first experience of driving a real big car was in the shape of a delivery van with a 4-h.p. Panhard motor, the vehicle being loaded with pig-iron. His pace was slow both on the flat and up hill, but after a time the road took a sudden and steep downward course, and in the desire to see what the vehicle was really capable of he let her have her head, and realised only too late that the brakes were apparently constructed for an ornamental rather than a useful purpose, and the fearful pace which the vehicle ultimately succeeded in attaining, and his efforts to steer a straight course, were still vividly depicted in his memory. Marvellous to relate he escaped unscathed. Referring to the early Bollée machine in the days between 1896 and 1898, he sketched an outline of what motoring meant in those days. As a rule, if you wished to go out on the following Friday evening the procedure necessary was to start getting the car ready on Monday, morning. After a week's labour you perhaps then had a fair chance of getting *somewhere* on the car, but how far that somewhere would be was a doubtful matter. You took with you spare parts sufficient to make another car, and as a rule you used them before you returned, that is if you were travelling more than 100 miles. In spite of these disadvantages, however, in spite of the struggles and troubles, it was very thorough sport, and the very uncertainty of one's destination day by day was not the least pleasurable of the features. Mr. Jarrott then gave some interesting particulars of his exeriences in connection with several of the big races, starting with Paris-Marseilles. He gave the following amusing description of an exciting experience which he had about fifty miles from London:—

"When I arrived in the town I had asked for some petrol, and had received two huge cans, which I emptied into my tank, and then tried to start the motor, and found, after reducing myself to a complete state of exhaustion, ruining my clothes, and taking the skin off my hands, that instead of petrol I had poured in paraffin. With the carelessness born of inexperience I emptied the whole of the petrol into the stable yard, where it ran down the drain, at the same time requesting the stablemen not to strike any matches. After I had finished this operation, and was just getting ready to push my car away and fill it up with the right petrol, a young man, remarkable for the correctness of his attire and for the absence of any appearance of brain, came into the yard with the confident intention of going out on a horse, and, striking a match to light his cigarette, was the cause of an alarming conflagration. On this occasion, however, the whole of the car was surrounded by flames as the petrol had ignited on the ground, in the midst of which I was going through the most extraordinary acrobatic feats to endeavour by my own efforts to move about 28 cwt. of motor car out of danger. The stablemen rushed up with bass brooms to beat the flames out and found—to their horror—that instead of accomplishing this the brooms themselves caught fire. The covering bonnet of my motor was off, and at last a brilliant genius rushed for sand, and, imagining that the unoffending motor was the cause of all the trouble, emptied the best portion of the same into, around, and on top of the motor. It took me about two days to get the pebbles out of the mechanism, and I think I received a bill for somewhere about £17 damage done to bass brooms, paint, personal attire, and the stablemen."

1899 found him using a 2¾-h.p. motor-tricycle for long-distance work, with which he took part in the great Paris-Bordeaux road-race in France. Mr. Jarrott gave a very vivid description of this event, and, continuing, mentioned his visit to America and the fearful experiences which he had in consequence of the so-called "roads" in the United States. Passing on to Paris-Bordeaux, he came to when he had his first chance of taking part in a big Continental race, viz., Paris-Berlin. In spite of the fearful experiences and mishaps which he went through in this run, he managed to finish eighth at Berlin. In 1902 he drove from Paris, on a light racing Panhard, to Nice for the Nice-Abazzia Race, which, at the last moment, it will be remembered, was abandoned, owing to the Government's permission being refused, after having originally been accorded; but Mr. Jarrott, nevertheless, enjoyed his experiences during this run, particularly on the return journey, through the mountainous district, with its lofty peaks and yawning precipices, to Grenoble and then on to Paris. A few weeks later he was more fortunate in being able to take part in the alcohol-driven vehicle contest instituted by the Government and known as the "Circuit du Nord." In this, after a fearful struggle, he finished second, the weather during this event being the worst he had ever experienced up to that time. Later in the same year he took part in the great Paris-Vienna Race, being accompanied by Mr. George Du Cros on a 70-h.p. Panhard. The remarkable mishaps which he experienced during this run, and his relation of one specially quick repair which they were able to effect, are now history, and he still regarded as one of his most extraordinary experiences the traversing of the Arlberg mountain pass. At one particularly bad corner they saw a leather coat and a few tools on the edge of a precipice, all that was left of a car which had gone clean over, but, marvellous to relate, although the car was smashed to pieces, neither the driver, Max, nor the mechanician were at all seriously injured. He recalled his splendid win of the Circuit des Ardennes in Belgium, when he covered the distance of 320 miles in 353 minutes, one of the most remarkable features of the race being that the time for each turn of the 53-mile circuit hardly varied a minute each time—a splendid example of how regularly and evenly the present day motor carriage was capable of running. In May last year, in the start of the Paris-Madrid Race, which ended so disastrously by the time Bordeaux was reached, he drove a De Dietrich car, drawing starting place No. 1, This racing car, which was specially built for the occasion, was got to the Paris Club only after a great struggle in time for it to be weighed in, the day before the actual race, when it was again taken to the Paris works for some finishing touches, Mr. Jarrott ultimately driving the car straight to Versailles on the night prior to the start of the race, he thus having only a trial run of about 12 kilometres before he started on this historical run. That under these circumstances he was able to reach Bordeaux second, and was first of the big cars in the race, is, indeed, a marvellous testimonial to both driver and car. His average speed upon this occasion worked out at 60 miles an hour, which included six stoppages from petrol troubles and little causes on the road. It was only after the first arrivals had put their cars in the garage and had returned to the finishing point to witness the arrivals of some of the other competitors, that the terrible rumours of death and accidents, subsequently confirmed, began to leak out, and the interdiction, by the French Government, of the continuance of the race followed as a matter of course. From that day racing both in France and elsewhere lay under a deep cloud as a consequence, until the Gordon Bennett Race, held in Ireland last year, proved that with proper organisation automobile racing could be carried on with safety both to the competitors and the spectators. Mr. Jarrott closed his paper by a few references to the Gordon Bennett Race, concluding by stating that it was a grand race—the finest race that had ever been run—with a magnificent finish, and whilst condoling with the Chevalier de Knyff, who drove on behalf of France, on his bad luck in not winning, he could but admire the dash and brilliant driving of Jenatzy, who fought the battle out so grimly.

In reply to a vote of thanks, proposed by the Chairman, Mr. Jarrott expressed his pleasure in having this opportunity of addressing the members of the Scottish Club, and, following up some remarks of the Chairman, he emphasised his view that the future acknowledgment of the rights of automobilists lay for the next three years with themselves, and counselled caution in all towns and villages, and consideration in meeting other users of the highway, who, he said, it must be remembered, had equal rights with the owners of motor cars, to its use.

THE paper on "The Cost, Upkeep and Care of an Autocar," announced to be read before the Scottish Automobile Club, Western Section, by Messrs. J. Hunter Steen and John Adam, on February 15th, is postponed until February 29th, in order that the event may not clash with the Crystal Palace Show.

Wolverhampton Automobile Club.—Upon the occasion of the third annual dinner of this club, held at the Victoria Hotel, Wolverhampton, last week, Mr. E. Lisle presided over a numerous company which included, amongst others, Mr. J. H. Cooksey (Town Clerk of Bridgnorth), Capt. Burnett (Chief Constable of Wolverhampton), Messrs. A. E. Jenks, H. W. Jenkins, H. M. Grove, H. H. Capes, A. Scott, C. F. Boyes, A. R. Norman, J. Shelter, J. O. Evans, C. D. Saunders, T. Edwards, W. H. Lennon, W. H. Evans, E. Lisle, jun., G. H. Onions, Trevor T. Young, W. G. Owen, T. Mills, H. E. Price, W. A. Rochelle, F. Platt, H. Van Tromp, F. J. Lisle, E. Bayliss, C. Perry, F. R. Byrne Quinn, E. Charleswood, T. H. Tomes, E. J. Hall, H. Joyce, and S. R. Rhodes (Hon. Sec.). A very welcome visitor was Capt. Burnett, in whose hands was placed the toast of "Success to Automobilism." He not only expressed himself favourably towards the industry, but confessed that he had enjoyed several runs, for which he declined to give the time occupied, and looked forward to further experiences in the future. He expressed surprise at the extraordinary variety of localities from which he had received applications for the registration of cars, owners having applied to him from Leicestershire, Devonshire, Yorkshire, &c.

Mr. S. R. Rhodes, in replying to the toast, congratulated the members upon the remarkable progress of the club, and mentioned that in 1902 the club numbered 26 members, owning 7 cars, of an approximate value of £1,300. At the present time they had 76 members, owning 46 cars, of an approximate cost value of £14,420. He was gratified to state that in the past year no member of the club had contributed, in the shape of fines, to the borough fund, a fact which spoke for itself in regard to the consideration of the members for other users of the road.

Mr. J. H. Cooksey remarked, as a visitor, that the only reasonable means of communication between Wolverhampton and Bridgnorth was a service of motor cars.

During the evening the prizes and certificates won in the Hermitage Hill-Climbing Competition were presented to the principal winners by Mr. J. H. Cooksey, and an excellent programme of music was provided for the entertainment of the visitors.

Yorkshire Automobile Club.—The fourth annual general meeting was held on the 14th inst. at the headquarters of the club in Leeds, Mr. T. E. King occupying the chair, the chief business of the meeting being the election of officers for the ensuing year. A number of nominations had been sent in and the ultimate result of the voting was as follows:—President: Earl Fitzwilliam. Vice-Presidents: A. W. M. Bosville, Esq., Bridlington; T. E. King, Esq., Harrogate; H. R. Kirk, Esq., Leeds; Harry Briggs, Esq., Bradford; W. Penrose Green, Esq., Leeds. Committee; Messrs. E. Faiers, Herbert A. Jones, R. Winn, Walter Jackson, Thomas Whitaker, Edward Hepper. Hon. Solicitor: Mr. Alf. Masser, Leeds. Hon. Secretary: Mr. Alf. W. Dougill, Leeds. Hon. Treasurer: Mr L. Hey, Leeds.

A number of formal matters were dealt with, and a brief résumé of the year's working was given by the Hon. Secretary. Mr. Faiers then gave a display of lantern slides, which proved of exceptional interest, the range of subjects being extremely wide, commencing with the early types of automobiles, followed, by way of comparison, with the latest types of cars. The series of slides, which recalled delightful memories of many club events, included snap-shots of prominent members of the club on tour in the Lake District, pictures of the Gordon-Bennett race, competitors, controls, and of the Yorkshire Club camp at Ardscull.

On January 20th Mr. W. Fitzwater Wray will give a descriptive lantern lecture, entitled "Old English Inns and their Story." The majority of the pictures will be from original photographs taken by Mr. Wray during a series of extensive cycle runs.

Auto Cycle Club.—Mr. O'Gorman's paper on "Improvements Desirable in the Motor Cycle," which was postponed on the occasion of the recent annual dinner, is to be read at the Automobile Club on the 29th inst., commencing at 8 p.m.

* * *

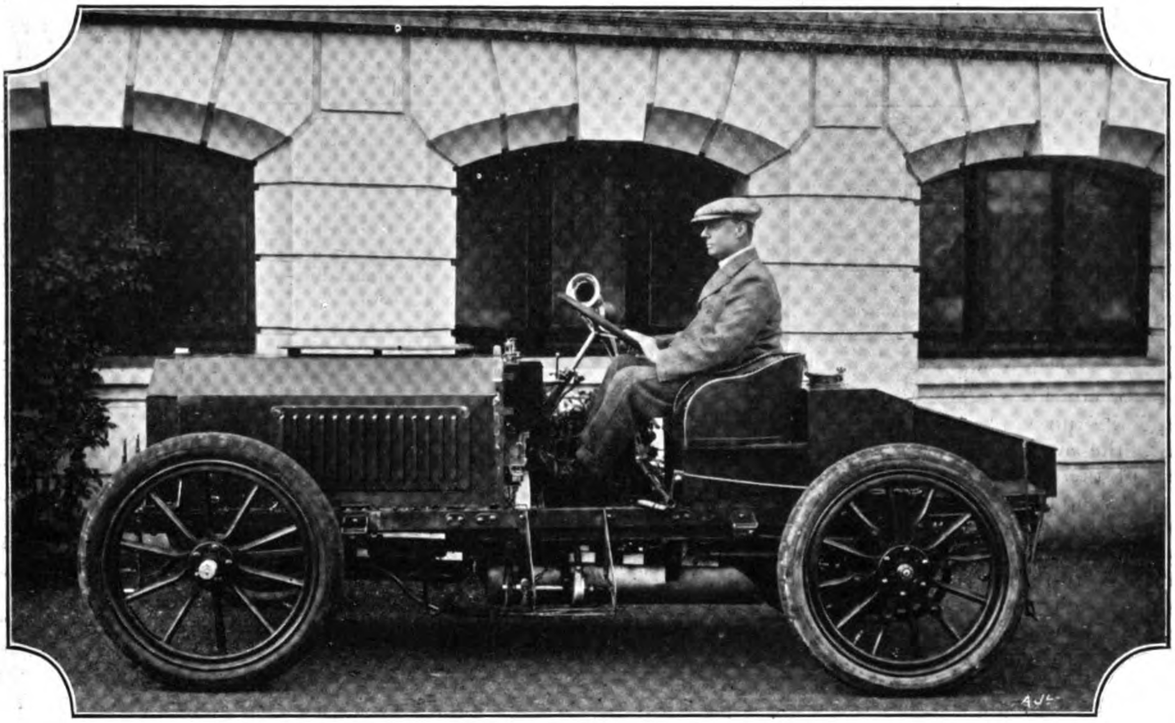
ON Friday of last week the Leeds Motor and Cycle Show was opened in the Engineers' Drill Hall at Leeds. This annual Exhibition is under the auspices of the Leeds Cycle Traders' Association, of which Mr. H. W. Elworthy is president. A goodly number of exhibits have been on view during the week, Messrs. Rice and Co. making a good show with their "Korte" cars, which are built in the district at Low Hall Mills. There are 25 stands in all, and the great centre of interest, so far as the automobile side of the Exhibition is concerned, is the 60-h.p. Mercedes belonging to Mr. R. H. Kirk, which is staged on Mr. Rowland Winn's stand. Mr. Winn has the finest show of cars of various makes, which include specimens of Lanchester, Humber, De Dion, Renault, Gladiator, De Dietrich, Ariel, etc. Amongst the motor cycles, in addition to the Ariel machines shown on Mr. Winn's stand, are machines by Clement-Garrard, Centaur, Rover, Quadrant, etc. No specimen, however, of either steam or electric car is shown by any exhibitor. An excellent selection of music has been contributed by the Second West Yorks R.E. Volunteer Band to the considerable enjoyment of the visitors during the week. The Show closes to-day (Saturday).

WE learn from Messrs. Clarkson, Limited, that in addition to the gold and silver medals awarded to them in the recent Reliability Trials the judges have awarded a special gold medal to the "Chelmsford" car (No. 95) for "general excellence, high efficiency, and for the very economical and highly successful burning of ordinary paraffin or kerosene oil." In addition to the Chelmsford cars, which are at present successfully running at Torquay and elsewhere, the firm have recently received a contract from the North-Eastern Railway Company for the supply of motor 'buses.

RACES, RECORDS, AND TRIALS.

GORDON BENNETT ITEMS.

Mr. Roger W. Wallace, and Mr. Julian W. Orde, the Secretary of the Automobile Club, travelled to Homburg at the end of last week for the purpose of inspecting the Taunus course, and making arrangements in the interests of the Automobile Club. The portion visited by them appears to give promise of a fair race, although some awkward points no doubt will have to be negotiated. In regard to the scenery the road traversed will afford a glorious treat for visitors able to witness this event.



Mr. John Hargreaves, of Templecombe, will be one of the new drivers who will compete in the English Eliminating Trials for the Gordon-Bennett Race. Mr. Hargreaves, who is an ardent foxhunter and M.F.H., and who was formerly in the 10th Hussars, is seen seated on a 65-h.p. Napier Racer. He has just received a 100-h.p. Napier, which we understand he will drive in the Race, should he prove successful in the Eliminating Trials.

Although a Special Commission has been appointed by the German Automobile Club to go into the question of lodgings, &c., during the Race week, it looks as if an organised onslaught is to be made upon the pockets of the visitors, natives and foreigners alike, by the residents and hotel-keepers. Herr Christ, of 20, Œderweg, Frankfort-am-Main, is one of the chief gentlemen dealing with the whole question, and communications should be addressed to him upon the subject. But, judging by statements already to hand, the plan of campaign of the German hotel-keepers, by its very greed, may defeat its own object. The famine prices demanded during the Gordon-Bennett Race in Ireland are nothing to what is foreshadowed in Homburg and the district. No rooms under any circumstances will be let for less than 8 days, bedrooms ranging in price from £1 to £2 10*s*. per night.

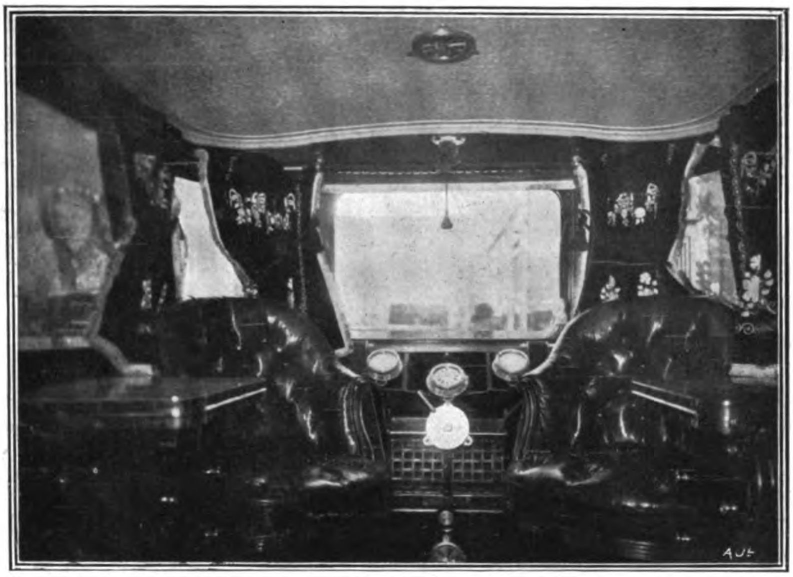
For the German Eliminating Trials, which will probably be held in the neighbourhood of Lüneburg, Mathis, Bugatti, and Butler are named as drivers for the three De Dietrich cars, Barbaroux and Ricordi for two of the Benz-Parsifal cars, Lewis for a Durkopp, and Fuchs for the Protor Fabrik car.

In France, Chev. R. de Knyff, Henri Farman, and Teste will probably drive for the Panhard firm, and Baron de Forest will join Jarrott and Gabriel in the De Dietrich team.

Georges Prade in company with Rigolly and others has been surveying the Argonnes route, which is the suggested eliminating circuit for the French cars. They are very enthusiastic over its suitable character, and every effort is to be made to obtain Government sanction for the racing to take place there.

An American contemporary has become quite infuriated by the practice that has grown up in Europe of speaking of the "Gordon-Bennett Race." The founder of the contest, it declares, is plain James Gordon Bennett, and denounces all attempts to give him a double-barrelled name as snobbishness and caddishness exemplified. It is particularly annoyed by attempts which it alleges have been made to surreptitiously and flunkeyistically introduce a hyphen between the Gordon and the Bennett. If it annoys our contemporaries across the Atlantic, there is no reason why we should not in future speak of the "Bennett Race." We certainly object to employing both Mr. Bennett's Christian names at the same time if for no other reason than that it will form a precedent, and there are gentlemen with a dozen or more Christian names. There was the celebrated "Alphabet" Smith, as O'Connell called him, of the early half of the last century, who rejoiced in as many Christian names as a French marquis. A Journal that always had to recite them all would have been in sorry case.

A RECORD long distance run on an electromobile is announced from Washington, U.S.A. An electric Stanhope equipped with a Porter battery, weighing, it is stated, 570 lbs., is declared to have run up and down the streets of Washington a distance of 121·2 miles in 10 hours and 32 minutes on a single charge. This was in spite of an accident due to collision with a wagon, which caused the spilling of some of the acid out of the batteries, broke some spokes, and necessitated the repairing of a tyre. For what it is worth this distance may count as a Transatlantic electromobile record, though the actual distance is claimed to have been exceeded on previous occasions even there. But it cannot compare as an exploit with Krieger's run of 185 miles from Paris to Chatelhérault, which was over ordinary country roads under unfavourable conditions; nor considering that the run was made on the smooth streets of the town is it, in our opinion, in any way superior to the Electromobile Company's run on a single charge, under unfavourable conditions, from London to Chippenham.



Interior of 25-h.p. M.M.C. Saloon Car which forms our "frontispiece." The seats consist of four revolving armchairs, and the clock, barometer, thermometer, and "engine-room telegraph" are visible in front.

IN connection with the Nantes International Exhibition, May 18th to September 15th, a heavy vehicle competition is to be arranged.

LAST week it was decided by the French Chambre Syndicale de l'Automobile that for the year 1905 classification by weight should remain in force.

CONSIDERABLE importance will attach to the automobile meeting in Algeria for the Coupe Sneyden over a flying kilometre, which will be held on February 14th, postponed from January 24th. Already entries have been received from Baron de Crawhez, with a 70-h.p. Panhard; Werner, with a Mercedes; Jenatzy, J. de Crawhez, &c.

THE committee appointed to conduct the Salon competition for the automatic starting of explosion motors has come to the conclusion that as the important object is to encourage the first efforts of everybody, bronze medals should be awarded to each of the four competitors. These were:—Chamoreau and Martin, Jeantaud, Krieger, and the Cie. Generale de l'Industrie Mecanique Electrique. The competition for the inflation of pneumatic tyres, in which the pumps and apparatus of various makers were tested in regard to the rapidity with which tyres of certain size could be pumped up by their means, and the applicability of the apparatus to all classes of vehicles, resulted in the following decision:—The Girip apparatus was accorded 80·9 marks out of a possible 100, the Sclaverand apparatus 74, and the Touzelet 31·1. A gold medal was awarded to MM. De Dietrich and Co., the exhibitors of the Girip apparatus, a silver medal to M. Morin, of the Sclaverand firm, while M. Touzelet received honourable mention.

THE Packard "Gray Wolf" racer, which has recently been establishing records in America, will be seen at the Nice Races, in March, and will probably be driven by M. Griet.

LAST week, in referring to the result of the 500 Metre Competition, held at Antwerp, amongst the winning cars we referred to the "Clement" car. This, we are advised by the British Automobile Commercial Syndicate, Limited, should have been mentioned as the "Talbot" car, the new name under which this make of car is now known.

PARTICULARS of the Fourth Annual Consumption Trial organised by *L'Auto* are published. The Competition will take place on March 3rd, 4th, and 5th, and the results will be arrived at under a new formula. Economy of fuel will largely enter into this, and will operate to discount speed, although a minimum speed will be insisted upon. The catalogue cost of the car will, as before, govern the method of classing, and an average minimum speed of 30 kiloms. in the open and 12 kiloms. in town must be maintained. Times will be specially taken on the Picardie Hill over 500 metres, with a flying start up and a standing start on returning. Any speed below 30 kiloms. per hour will entail loss of marks. The marks will be allotted according to the following formula:—

1. *For the consumption per ton of total weight*, the marks will be the number of litres consumed divided by the total weight in tons and multiplied by the co-efficient 10.
2. *For the consumption per ton of useful load*, the marks will be the number of litres consumed divided by the useful load in tons and multiplied by the co-efficient 10.
3. *Regularity of running and mean speed.*—No competitor who gets over the course in less than four hours (an average speed of 25 kilometers) will be penalised, but every car that goes at a lower average speed than 25 kilometres will be penalised as follows: the difference between the average speed of the vehicle and the minimum average speed demanded will be expressed in kilometres and multiplied by the co-efficient 25, and the resulting number deducted from the marks obtained.

A 7½ miles' straight speedway is under construction at Los Angeles, California, which has only 15 feet fall in the whole distance. On the mile and kilometre stretches, which will be utilised for making record performances, it is stated there will be a fall of less than one foot in the whole mile. The course is to be 100 feet wide, and as the track will run parallel to an electric trolley railway, there should be opportunities of witnessing, under unique circumstances, the attempts which will be made to better present records.

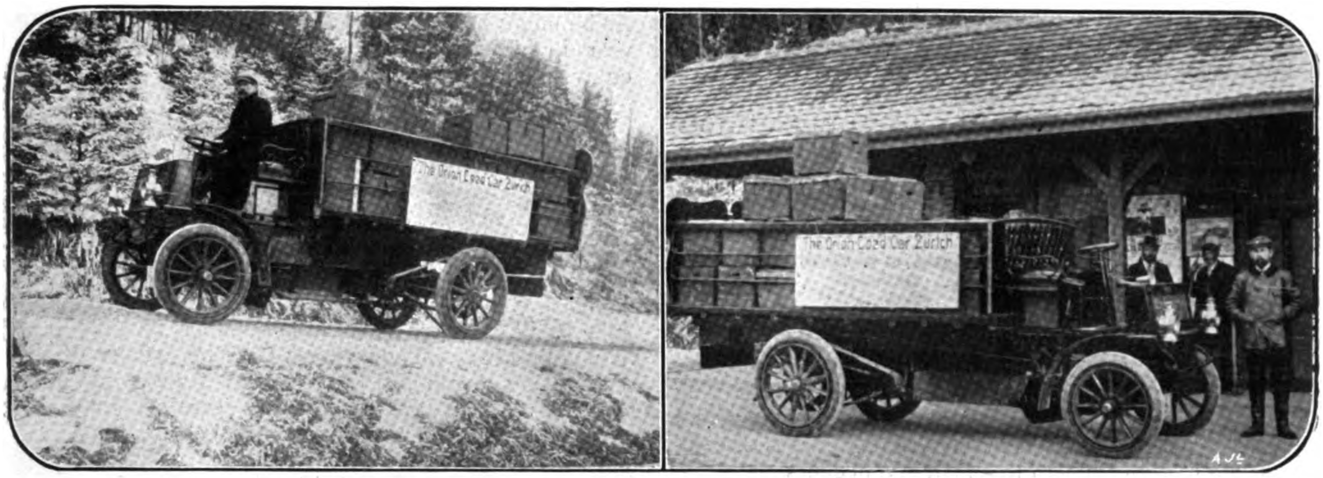
M. TAMPIER, the well-known official timer of the A.C. of France, will have charge of the timing arrangements for the Monaco Motor Boat Races in April.

EIGHTY-ONE entries was the final total, at the closing of the lists, for this competition.

WE knew it—it was bound to come—"Sunny Jim" has acquired a motor car by means of "Force."

OVER 20 automobile and motor cycle clubs have accepted the invitation of the A.C.G.B.I. to the Conference of Clubs to be held on Feb. 15th, at 119, Piccadilly, to discuss the present position of the automobile movement, and to consider in what manner organised bodies of automobilists can best combine to advance it.

MR. HENRY W. THORNTON has been gazetted Lieutenant to the Motor Volunteer Corps. The dress uniform of the Motor Volunteers has now been decided upon. It is of olive green cloth, white facings, black astrachan collars and cuffs, and silver lace trimmings, and a busby of astrachan fur. For work in the field the uniform which has hitherto been in vogue will probably be adhered to.



Solid progress in Automobilism is being made in Switzerland, and the Orion Roadcar Company of Zurich has already established a very satisfactory reputation for its lurries and heavy delivery vans. Mr. W. C. Moss, the London agent for this firm, who has recently been staying at Zurich, sends us some photographs (which we reproduce above) illustrative of a decidedly venturesome experiment he made with one of the Company's vehicles. He thought he would like to try how far he could get up the Uetliberg, and with Mr. Zürchner, the designer of the lurry, and a mechanic he commenced the climb. The road, on which the gradients are, we understand, terrific, was in very bad condition owing to a thin layer of frozen snow, and two of the party had to spend most of their time with pickaxe and shovel on the road in front of the vehicle removing the snow, while the third drove. Eventually the top (873 metres) was reached, and Mr. Moss telephoned to Zurich for a photographer, who came up by the mountain railway and took the views we have reproduced.

THE dates have been now fixed for the Motor Boat Race between Calais and Dover in connection with which the Coupe Récoupé will be competed for. On August 13th the race will be a scratch race from Calais to Dover, the next day a handicap race back to Calais, and August 15th a handicap race will be run from Calais to Boulogne, and back to Calais.

BARON DE ZUYLEN has resigned the Presidentship of the General Automobile Association of France, owing to the enormous calls upon his time. He has been unanimously elected as a Founder President, and the Marquis De Dion has been elected as the new President, with, as Vice-Presidents, MM. Rives, Jeantaud, and Martin Du Gard.

SOME practical experiments in the use of motor wagons for military purposes are in progress at Metz.

WE have had occasion to remark more than once on the impartiality and judicial spirit displayed by Judge Emden in his utterances in regard to motor cases that come before him. A case was recently tried in the Bromley County Court in which damages were claimed for an accident in which a horse-drawn vehicle was concerned. There was a good deal of difficulty attached to proving the ownership of the horse-drawn conveyance, and Judge Emden very properly observed that these vehicles really needed numbering a great deal more than motor cars. Every automobilist naturally feels that what is sauce for the goose ought to be sauce for the gander, and that the numbering of motor vehicles is an invidious distinction. We certainly hope to see the day when all vehicles will be similarly treated in this respect.

Motoring in France is the title of a new illustrated monthly periodical devoted to automobilism in France. It will be published in Paris in the English language.

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SIR GEORGE NEWNES has taken considerable interest in the class for chauffeurs which has been held for some time in connection with the Battersea Polytechnic, and, as a result of a generous offer on his part, the Polytechnic has been able to acquire a 24-h.p. Darracq car for the purpose of giving driving lessons.

ARRANGEMENTS are already well in hand for organising on an extensive scale automobile and cycling sports at the 1905 Liege Exhibition.

ARISING out of the trouble between the Vienna cabmen and the public, the Vienna Town Council are seriously considering a proposition to inaugurate a system of public service automobiles on a very large scale, 3,000 motor cars being mentioned!

FOR some time it has been rumoured that the celebrated firm of Cockerill of Seraing, which is so well-known for marine engines, intends taking up extensively the manufacture of automobiles. This is now confirmed, and special attention will we understand be devoted to lurries and heavy vehicles.

BY a decree issued last year, vehicles in Rheims are limited to a speed, on the outskirts of the city, of 12 kilometres per hour, and in the frequented streets to 8 kilometres. Every type of vehicle comes under this regulation, and already the absurdity of the regulation is being voiced by every member of the community.

AN American contemporary suggests, apropos of the fact that cars in the British Islands can, according to the new Act, be registered with any local authority, that English hotel keepers might attract custom by bestowing free registration on their guests, in the same way that Milwaukee hotel keepers provide those desirous of committing matrimony with free marriage licences.

SOME time back we chronicled the fact that a State motor car and a number of motor vehicles for the use of the suite had been supplied to the Chinese Court. It is interesting to learn that one of the consequences has been that the Dowager Empress has become wildly enthusiastic on the subject of motoring, and the dozen cars which had previously been supplied to the Chinese Court are to be supplemented by a further order to the same makers for fifty more. Hitherto the Dowager Empress of China has been a rather reactionary ruler. We trust that the charms of motoring will liberalise her ideas and make her more generally accessible to Western notions.

MOTORISTS in the small island of Guernsey, as regards the numbering regulations, are not so badly off as in the United Kingdom. Motor-cars and motor-cycles are only made to display a number at the back. But the number-plate is quite unobtrusive; it measures 2½ ins. in width. The lighting of numbers after sunset is not required, an ordinary tail-lamp on cars being deemed sufficient for all practical purposes. It is worthy of notice, too, as showing the very friendly attitude of the island authorities towards automobilism, that there is no record of any prosecution having yet taken place. Compared with some of the countries in the United Kingdom, Guernsey, although only thirty miles in circumference and geographically isolated, compares favourably in point of automobilism, the most recent return showing that there are twenty-four motor-cars and motor-cycle owners in the island, some among whom, besides, a number of motor-launches. The idea of forming a club is under consideration.

SOME of the aftermath of the Paris-Madrid fiasco has taken the form of a police court action, brought at Chateaudun against Mr. Porter, whose chauffeur, William Nixon, of Belfast, met his death in the accident which happened to Mr. Porter's car. It is satisfactory that Mr. Porter's advocate before the tribunal was able to state that the Nixon family had no feeling in the matter, and recognised the death of Nixon simply as a fatality. It was further pointed out that the statement made by the prosecution, that Mr. Porter was driving at the speed of 80 kiloms. per hour, was inconsistent with the facts, as, had he been doing so, he would have arrived at the level crossing a quarter of an hour before the time at which he actually passed it. The final result of the proceedings was that Mr. Porter was fined 200 francs. As he might have been imprisoned for a period of two years in addition, this decision is regarded as practically equivalent to an acquittal.

THE United Motor Industries, Limited, have declared a 10 per cent. dividend for the year 1903.

THE Achilles car, which was seen for the first time in the 1,000 Miles Reliability Trials, will in future for London and the Home Counties be entirely in the hands of Goodall's Automobile Agency, of 172, Pentonville Road. A very useful little book has recently been issued by Messrs. Thompson & Co., the makers of this car, giving a number of "Golden Rules" for automobilists which are well worth careful study and remembering when any trouble arises on the road.

DETACHABLE water-cooled heads fitted with mechanically-operated inlet valves, as well as with exhaust valves of the same type, are being made by the Motor Castings Company, of 101, Gray's Inn Road, for attachment to existing air-cooled engines of either the De Dion or M.M.C. types up to those of 3½-h.p. The Company inform us they are prepared to convert these engines at a comparatively low cost, and can make the valves of any reasonable diameter to suit their customers' requirements.

THE business of the Century Engineering and Motor Company, Limited, Cumberland Park, Willesden Junction, we are notified, has been acquired by the Century Engineering Company. This company has been building the Century cars and tandems for the past four years, and Mr. R. W. Leader, who will control the policy of the company, we understand is introducing several new models at the forthcoming Crystal Palace Show which are likely to prove of considerable interest.

City and Suburban Electric Carriage Company (1903), Limited.—Following a resolution of the company in extraordinary general meeting on December 10th confirmed on December 30th, to wind up the company voluntarily, notice is now given that claims against the company should be sent in on or before February 17th next to Mr. W. Barclay Peat, 3, Lothbury, E.C.

International Automobile Manufacturing Company (Limited).—Resolutions to wind up voluntarily were passed by the shareholders of this company on December 11th and confirmed on the 29th, Mr. N. Ogle, Worcester House, Walbrook, and M. E. Gerondal, of Brussels, being appointed liquidators.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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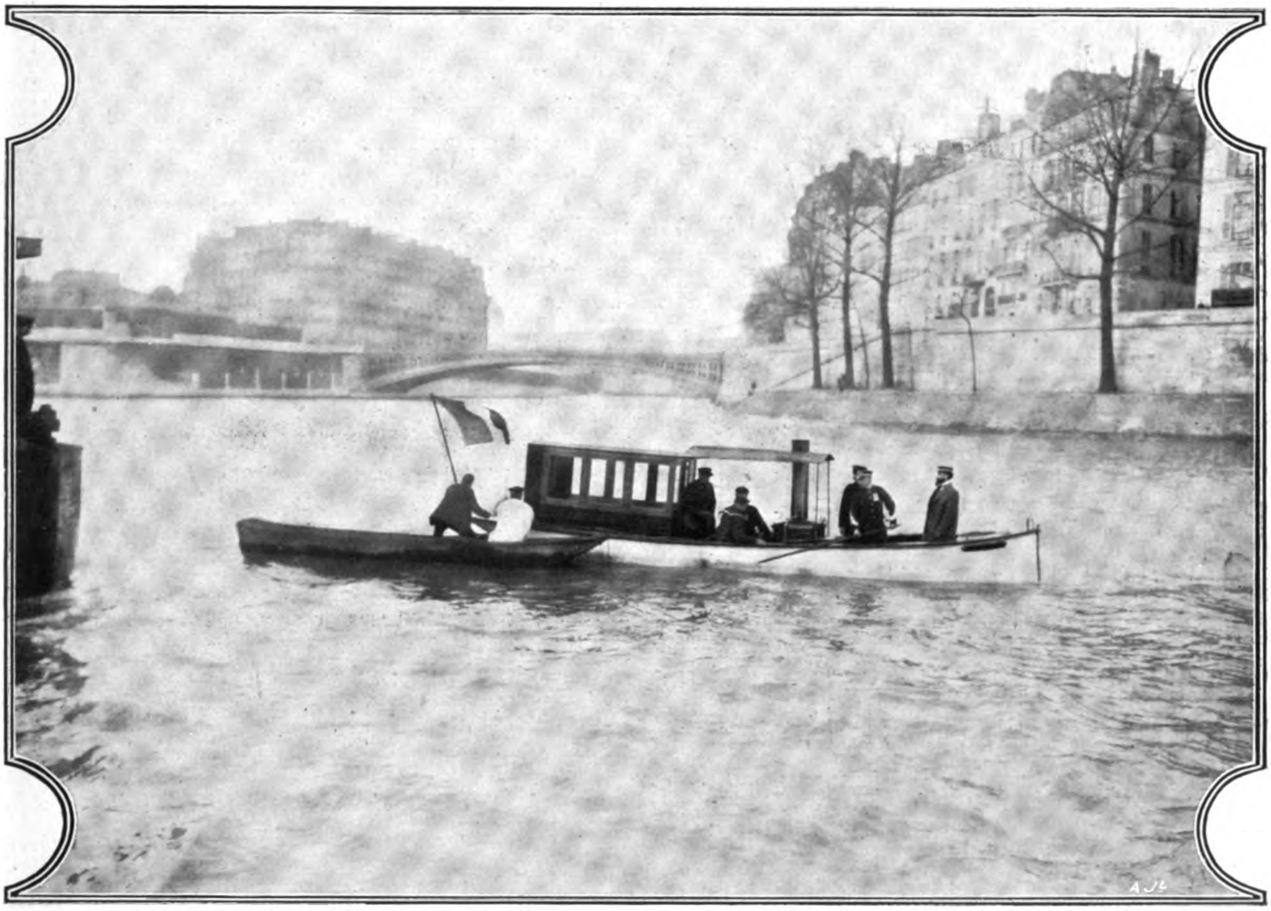

On the Seine the motor boat has been adapted by the French River Police to the new and rather sporting occupation of chasing and securing river poachers. Most of these poachers go out in row-boats, and are a considerable nuisance and trouble to the authorities, as the amount of fish they extract from the river is at times very considerable. Our frontispiece shows the little steamboat, "Mouette," capturing a poacher's boat. The "Mouette" works in concert with police officers mounted on bicycles, who patrol the banks and collect information as to when and where the poachers have embarked. The chase then commences, and usually ends in the manner our illustration depicts, for the row-boats of course have no chance of escaping from the fast little steamer. It is characteristic of the common-sense of the French authorities that the fish captured from the poachers is distributed among the Paris hospitals.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Feb. 1 ...	Final Entry Day for British International Cup
Feb. 1 ...	"Evolution of Road-making in Scotland," by Mr. R. Drummond, C.E. (Scottish A.C.).
Feb. 2–6 ...	Liverpool Cycle and Motor Show (St. George's Hall).
Feb. 3 ...	"Steam Cars for Public Service," by T. Clarkson (Society of Arts).
Feb. 10 ...	"Motor Traction in War," by Major W. H. Balfour (Royal United Service Institution).
Feb. 11 ..	"Recent Developments in Internal Combustion Engines," by Mr. L. Rottenburg (Glasgow University Engineering Society).
*Feb. 11 ...	"The British Automobile Industry," by Mr. T. C. Aveling (A. C. Paper).
Feb. 12–24 ...	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
*Feb. 12 ...	Quarterly 100 Miles Trial.
Feb. 15 ...	A.C.G.B.I. and Provincial Clubs' Conference.
Feb. 23–27 ...	Hull Cycle and Motor Show (Assembly Rooms).
Mar. 4 ...	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
Mar. 25–30 ...	*Side-Slip Trials.
April or May ..	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

* Automobile Club of Great Britain and Ireland Events.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Jan. 23–Feb. 4	Brussels Automobile Salon.
Feb. 3–6 ...	Paris-Turin Tourist Run (*France Automobile*).
Feb. 6–13 ..	Chicago Show.
Feb. 6–21 ...	Turin Exhibition.
Feb. 14 ...	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Feb. 15–20 ...	Detroit Show.
Feb. 23–27 ...	Anti-Skid Trials at Versailles.
Feb. 29–Mar. 5	Cleveland Show.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 3, 4, 5 ..	Fuel Consumption Trials (*L'Auto*).
Mar. 6–12 ...	Buffalo Show.
Mar. 13–20 ...	Cannes Automobile Week.
Mar. 14–19 ...	Boston Show.
Mar. 15–16 ...	A.C. America Commercial Vehicle Trials.
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Mar. 23–27 ...	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Nice-Rome.
May	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 1–12 ...	A.C. Bordelais Automobile Fortnight.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif.*
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June 7 ...	Namur Week.
June 7 ...	Spa Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 23–25 ...	Lucerne Motor Boat Races.
Aug. 5–11 ..	Paris–Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 13–14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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PASSING EVENTS.

Look Here Upon this Picture—And on This!

April 29th, 1902 :—

> "Under these circumstances the Executive Committee withdraw their name and their patronage from the proposed Exhibition at the Crystal Palace in January next, and refuse to give their name or patronage to any outside Exhibition until the trade have ceased to pursue the policy now adopted by the Automobile Mutual Protection Association. . . . . The Committee of the Club . . . feel that they cannot with dignity continue to negotiate with a trade which is divided against itself."

January 18th, 1904 :—

> "The position regarding the Exhibition question was discussed, and it was resolved : 'That the Club do give its patronage to the Ninth Automobile Exhibition, to be held at the Royal Agricultural Hall, Islington, from Saturday, March 19th, 1904, until Saturday, March 26th, inclusive, for the year 1904.'"

These two quotations bring into forcible relief the change from the dignified attitude which the club assumed with regard to the Automobile Exhibition question in May, 1902, and the mistaken position it has thought fit to take up in regard to the same question in January, 1904. It would be impossible to find a more forcible commentary on what we have advanced concerning the change in the policy and attitude of the Automobile Club in regard to the industry generally.

The first of the passages we have quoted above was contained in the pronouncement made by the club committee on the Exhibition question a year and nine months ago.

After much preliminary discussion on the Exhibition question and fully considering its various aspects, the club committee came to a decision which was communicated to the Automobile Manufacturers and Traders' Association in an official statement on the 29th of April. This statement, culminating in the pronouncement of the club's decision which we have placed at the head of this article, after dealing generally with the subject, contained the following weighty observations :—

> "In a leading article in *Notes and Notices* of the 20th March last . . . . . the policy of the club as regards Exhibitions was clearly set out.
>
> In that article it was stated that, if the trade would settle on one Exhibition, and would agree to abide loyally by this decision, the club would give its patronage to the Exhibition. . . . . . On the other hand, if one portion of the trade decided to support one Exhibition, another portion another Exhibition, the committee of the club would refuse to give its patronage to any Exhibition whatever, so long as this course was pursued. . . . . .
>
> It appears that the Automobile Mutual Protection Association, Limited, have decided to adopt this fatal policy.
>
> In agreeing to give their name to the Crystal Palace Exhibition in January next, they did so in the belief that the trade, as a whole, would loyally abide by the decisions come to by its appointed representatives. It now, however, appears that a section of the trade intends to be disloyal to the decision come to, and to adopt the disastrous policy of two Exhibitions."

The club committee in April, 1902, were, therefore, after looking at the subject from every possible point of view, fully persuaded of the great disadvantages to the trade generally of divided control in the organisation of the trade exhibitions.

The committee of the club, after lengthy consideration and discussion, determined to refuse their support to any automobile exhibition until the trade were united and had agreed upon the policy to be pursued. The split continued, and since then three separate exhibitions have taken place in the Metropolis, and the club has refrained from according its support to any of them. Now suddenly the committee announce that they have decided to bestow the patronage of the club on the Exhibition to be held at the Agricultural Hall. Part consideration for this patronage of the "Society of Encouragement" is £500—of which fact Mr. Cordingley makes no secret. It is obvious that if the policy of the club was right a year and a half ago, if the committee were right, as we believe they were, in recognising the extreme disadvantage of divided control in the organisation of exhibitions, and if they were justified in taking the drastic measures that they did take to ensure as far as they could that the policy they had adopted should be carried out, that their determination to depart from this position at present and identify the influence of the club with one particular exhibition while the trade continues to be divided on the subject requires, to say the least of it, elaborate explanation. No such explanation has been vouchsafed.

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THE question is not in any way which Exhibition ought to be supported. The Exhibition at the Agricultural Hall promises to be this year, as in the past, fully successful, whilst the organisers of the Exhibition at the Crystal Palace find it impossible to provide all the space which has been applied for. Mr. Cordingley, as a man of business, was fully justified in agreeing to make the payment demanded if he considered the patronage of value. The point is that, in selecting one of the shows for its special patronage, the club is taking a side, and descending into the arena on behalf of one of the contestants, after having deliberately declared that this was a course which, in the interests of the movement, it would never adopt. We completely fail to see that there has been any change in the position, and that the committee of the club now takes a different view is simply a further illustration of its growing incapacity to understand the true requirements of the movement and the industry.

The moment which the committee has selected for abandoning what has hitherto been its policy in this matter is a particulary unfortunate one. Everyone really interested in the automobile movement was aware, or ought to have been aware, that a *rapprochement* between the organisers of the rival shows at the Crystal Palace and the Agricultural Hall was taking place. It was anticipated that, recognising the disadvantages attaching to competitive exhibitions, the opposing forces were willing to amalgamate and organise to that end in future. That such a consummation would have been greatly to the benefit of the trade and the industry, the slightest doubt cannot be entertained. At the very instant when the rival interests were preparing to abandon their attitude of hostility to one another, the Automobile Club makes an ill-omened entry upon the scene and throws an apple of discord in between them.

Rather as a "Society of Encouragement," the Club should have done its utmost to remove what discord still remained, instead of taking steps calculated to estrange still further the largest section of the trade.

It is a danger inherent in the situation, as we have repeatedly pointed out. Once a "Society of Encouragement" commences to trade it is sure to be sooner or later betrayed into undignified situations. It has been betrayed into another such situation very soon. For a club, whose influence and power for good is bound up with its independence of all trade interests, to ally itself financially with one of two trade exhibitions in opposition to the other is deliberately to abandon its independent position. Having done this, it can no longer lay claim to be an unprejudiced promoter and encourager of the movement, seated high above the level of pecuniary considerations, and uninfluenced by the exigencies of trade or commercial rivalries.

We have received a large number of letters from manufacturers expressing astonishment at the change of front on behalf of the club after their solemn pronouncements on the subject formerly. That an intention has been proclaimed of employing a share in the pecuniary profits arising from the Agricultural Hall Exhibition, which will fall to the lot of the club for bestowing its patronage upon it, for the purpose of experiments in dust laying, side-slip trials, or other benevolent objects, does not appear to produce much effect upon the views held by our correspondents. Probably it would not even do so if a time limit within which the money was to be so allocated had been announced. Failing this, it naturally produces no mitigating impression whatever.

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A Valuable Accession to the Industry.

THERE is no more encouraging symptom of the increasing prosperity of the British motor car industry than the manner in which engineering firms of great and extended experience are gradually turning their attention to automobile manufacture. Hitherto in this country, in contradistinction to the state of affairs which has prevailed on the Continent, leading engineering firms have had such an extended market for their staple manufactures, their business has been so prosperous, and their works so fully engaged, that they have had no reason to look round for new fields to conquer, new branches to adopt, and have, consequently, felt little inclination to take up the manufacture of self-propelled vehicles until circumstances have proved the value of the profits to be reaped, and the extent and permanence of the public demand. When engineering firms of high standing and world-wide reputation proceed to organise automobile manufacturing departments on an extended scale, it is the best possible testimonial to the prosperity and importance of the new industry. These remarks are suggested by the formal entry of the great firm of gas and oil engine manufacturers, Messrs. Crossley and Co., into the ranks of automobile builders. The function held to commemorate this auspicious event is referred to in another column, and we also describe their new standard car this week. When firms of such standing adopt a new manufacture they bring a wealth of experience, perfect organisation and management to its development which new firms or companies can scarcely expect to gain at once in as full a degree; while the care and reputation for trustworthiness and durability which is characteristic of their productions in other lines are a guarantee that their new manufactures will possess the qualities which have made their reputation in other lines. The greater the extent to which the automobile public recognises these elements as the distinguishing features of British-built cars the better it is for the British automobile industry, and it is on this account, therefore, that the entry of the Crossley firm into the automobile industry is to be regarded as an occurrence of the greatest importance and promise.

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An Aeronautic Symposium.

WE give illustrations in another column of the latest Wright aeroplanes with which some of the more recent experiments of the Brothers Wright were conducted, and which enable the arrangements of their actual motor-driven machine to be readily understood. It is appropriate that at the present date, when the interest in aeronautics is daily increasing, that a banquet to do honour to Professor Langley should have been arranged at the Waldorf Astoria Hotel. Though the Wright Brothers hold the record for actual performances up to the present, it must never be forgotten that it was Professor Langley's steam-propelled machine that holds the record for long distance free flight (on the Potomac River, in the year 1896), though no aeronaut was carried on the machine at the time. The dinner to Professor Langley was given by Mr. Brisben Walker, who is very optimistic on the future of the flying machine, and thinks that the day will come—he has probably been reading Mr. H. G. Wells—when it will form not only the cheapest but the safest means of transportation. Among the guests at the banquet was M. Santos Dumont, but the gathering was to some extent illustrative of the fate which is usual to a prophet (or experimenter) in his own country, for there was no reported reference to the exploits of the Brothers Wright, or their brilliant teacher Mr. Chanute. This is the more to be regretted since the more thoroughly the problem of aeronautics is studied, the more apparent does it become that the results obtained by these latter investigators leave all previous results an almost immeasurable distance behind from the practical point of view. It is never wise to prophesy, but one of the safest prophesies in which one could indulge is that when the problem of aerial navigation on the heavier than air principle is solved, it will be found that one of the main elements in the solution is the preservation of the centre of gravity constant, and it is the recognition of this principle which has largely enabled the Wrights to obtain the results they have accomplished.

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To be Stopped for the Sake of Automobilism.

WE trust that the shocking accident to Frl. Mina Alix in "looping the loop" in a so-called motor car at the Circo de Price in Madrid will have the effect of putting a stop to these senseless and risky performances, the only attraction in which is the danger they occasion to the executant. The term "motor car," as of course the vehicle employed is not self-propelled, has been dragged into these senseless exhibitions, to the discredit of the new locomotion. The thing is so silly. It is more difficult to "loop the loop" on a bicycle than on a dummy motor car, and if Fraülein Alix had been on a bicycle she would have escaped a great deal of the injury which the fall of the machine occasioned, while quite probably the accident would not have occurred at all. In any case we trust the accident may be made, as we have suggested, the occasion for stopping exhibitions of the kind. Sufficient fuss was made about the misadventures attending the Paris-Madrid Race in which a tangible object was to be gained. There is nothing to be gained in merely dangerous performances except gate-money for those who give them, and that does not provide an adequate reason for their continuance.

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From the Unseen.

WE did not at first suppose that there was any connection between the humorous ghost of Coedkernew, in Monmouthshire, and the automobile movement. The Coedkernew ghost is a spook with a very pretty wit. He throws all sorts of things about, and is apparently determined to make the greatest possible amount of unpleasantness for the housewives in the premises he honours by his visitations. He has pulled the beds downstairs (if the local accounts can be credited), mixed soda with the housekeeper's lard, and emptied a jar of pickled cabbage into a basin of cream. So a local Society for Psychical Research was formed, consisting of ten persons and the village policeman, and this "Society of Encouragement" sat up to wait for the ghost. The ghost did not put in an appearance, but soon after the hour of midnight had passed and the psychical researchers were beginning to feel the hair slowly rising on their heads, half a pound of butter, projected with unerring aim, hit the village policeman straight in the eye. It has since been suggested that this proves unquestionably that the frolicsome spirit is that of a recently deceased automobilist who had frequently been held up by the police and fined for driving above the legal limit. Hence the connection of this particular psychical manifestation with the new locomotion. But we are pleased to be able to assert that so far the malevolent suggestion lacks even the most spectral confirmation.

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The Chairman of the Automobile Club.

EVERY automobilist in the country, and, above all, every member of the Automobile Club, will learn with feelings of regret that Mr. Roger W. Wallace, K.C., has determined for the second time, and we understand irrevocably, to retire from the chairmanship of the Automobile Club. This position has been held by Mr. Wallace since the club was founded. In the days of storm and stress, when it was a new institution representing all that was best and most progressive in the movement, he helped to guide its course and control its policy with singular skill, with unfailing tact, and with a good nature and courtesy which have made him popular with everyone with whom he has come in contact.

Mr. Wallace has on a previous occasion proposed to resign the chairmanship. Only after considerable persuasion was he prevailed upon to continue in office, so that it may be assumed that his decision is now final and that the club will find itself compelled to elect another chairman. The members will be well advised to consider their selection carefully. The position and prestige of the club are not what they were when Mr. Wallace, upwards of eighteen months ago, consented to continue for the time being in office. Much depends on the capabilities, tact, and position of the chairman of such a body as the A.C.G.B.I., and it may be permitted us to hope that the successor ultimately chosen to fill the office Mr. Wallace has so long and capably discharged, will, in the interests both of the automobile movement and the club itself, have no personal connection with the trade. It is of the greatest importance that the chairman of the club should have no interest whatever in any automobile manufacturing concern, so that no member of the trade can have the slightest ground for supposing that the head of so important a body should ever find his duty to the club or the movement in any sort of conflict with his own individual interests. If, too, the chairman should happen to be unconnected with financial undertakings of the more elaborate sort, we cannot avoid the conviction that it would be a still further advantage both for the movement and the body he represents.

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Coincidence or Worse?

OUR readers will remember that Mr. Smith, the genial landlord of the King's Head, Cobham, figured some time ago in a curious police case. One of the usual traps had been set not far from Cobham, and Mr. Smith went out and warned approaching motorists that the trap was set and baited. The consequence was dismal failure for the ambushed policemen, as they only witnessed a funereal procession of motor cars, whose drivers chaffed them unmercifully. So the same evening they discovered a man at the King's Head whom they said was being provided with drink while in a drunken condition, and summoned Mr. Smith for so providing him. The case was dismissed, and we venture to think the man would not have been discovered had Mr. Smith not observed and "sprung" the police trap. Is it a coincidence that one of the first police traps of which we have heard tidings under the new Act was organised on Sunday, the 17th, just outside Cobham? As usual the motorists got wind of the arrangements, but the police were not to be baulked, for though the cars filed past them at the same sedate pace as before, several summonses have been issued, followed in one already by a conviction. Let hotel owners beware! If they cater for automobilists, and warn automobilists of police traps, it is evident that their business is to be systematically attacked by the arrangement of motor traps on the roads round them. But what contemptible tactics! What prolonged and petty spite! Surely the sensible heads of the police force should have this sort of thing stopped, as they must recognise that this kind of thing is calculated to forfeit the respect and consideration of every fair-minded member of the public.

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A True View of the Matter.

WE have not been troubled with dust lately. It requires almost the faith which would remove mountains to believe that we shall ever be troubled with dust again. So that a discussion on the dust problem is not very seasonable, resembling rather, as Emerson used to say, the sound of a scythe in December when there is nothing to mow. We would not enter upon the discussion ourselves, but that a writer in the *Referee*—a paper which is in general remarkable for all-round fairness—has been promulgating a very sensible view of the dust problem. He denies, like all observant people, that motor cars produce dust. The most they can do, he says, is to raise dust when it is already there. When the alternations of frost and thaw that have constituted the present winter subside, if they ever do, and once again the roads become dry and dusty, his advice may possibly be worth following. He says, "why should not motorists combine together and lodge protests" (ultimately followed possibly by legal action) against the District Councils and other local authorities whose roads are abnormally dusty? Considering that the dust nuisance brings more hostility upon the motorist than any other cause, except possibly running over dogs, the suggestion is worth consideration, and one would certainly like to observe the expressions on the faces of a District Council on being arraigned at the instance of a body of motorists for permitting their roads to be unduly dusty.

THE CROSSLEY PETROL CAR.

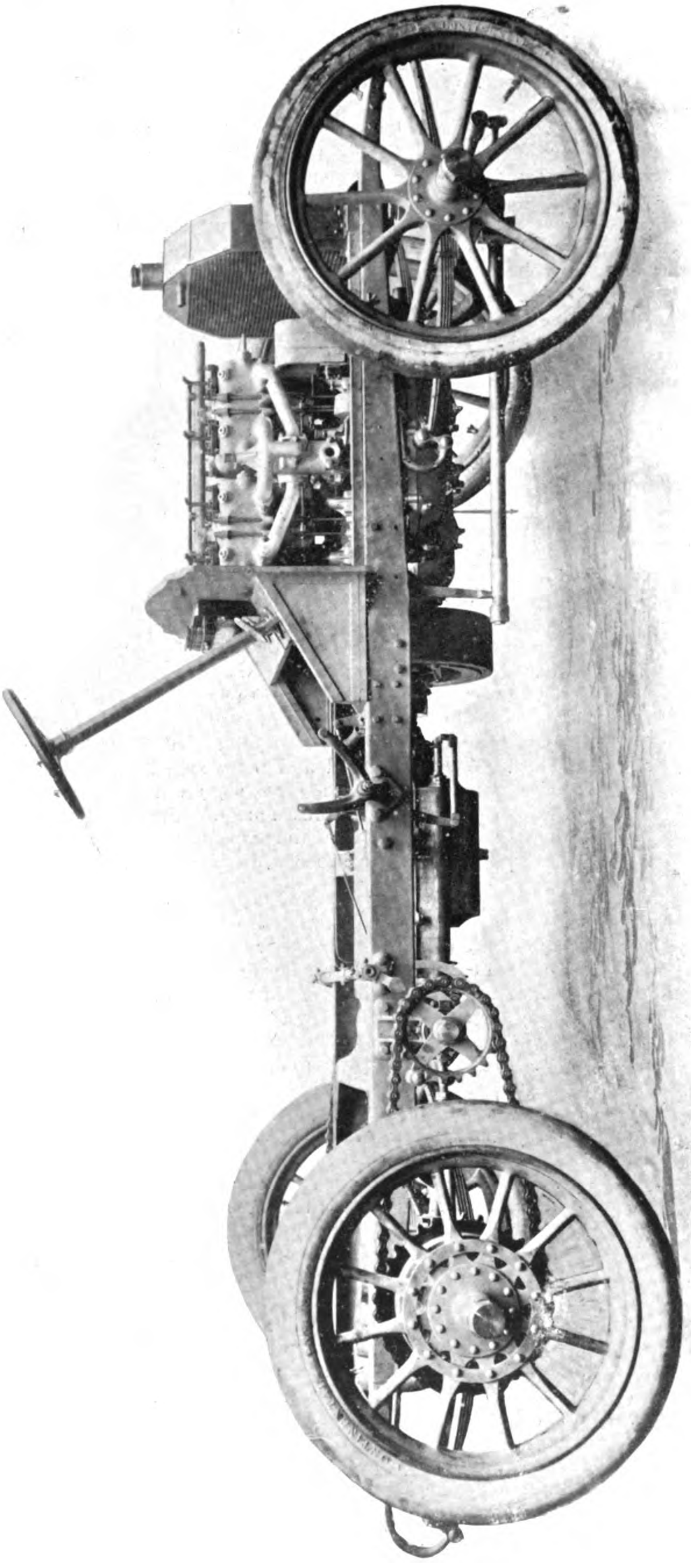


Fig. 1.—The Crossley Petrol Car—Side View of the Chassis, (the hand-levers, with their quadrant, are not fitted).

It has been an open secret for some little time that the celebrated firm of Crossley Bros., whose gas engines have a world-wide reputation, were about to take up the manufacture of automobiles, and that these cars would first be introduced to the public at the forthcoming Exhibition at the Crystal Palace by Messrs. Jarrott and Letts, with whose assistance, and that of Mr. J. S. Critchley, they have been produced. The mere fact that an engineering firm of such high standing should have taken up this work is not only highly satisfactory to those who have the interests of the British industry at heart, but will also be cordially welcomed by motorists generally throughout the country, for it was a foregone conclusion that any vehicle turned out by these manufacturers would be second to none in the world—so far, at least, as excellence of material and workmanship are concerned. It is, of course, in these works that the famous Otto gas-engines have been built, and that the enormous business which is now transacted by the firm has been steadily developed and continuously increased. It might, perhaps, have been expected that the prosperity of the business would have reached its height before the expiration of the patent which practically gave them a monopoly in the gas-engine business, and it may even have been thought by some that Messrs. Crossley Bros. were one of our old-fashioned engineering firms who are *popularly* believed to remain satisfied with antiquated methods, and to complacently allow foreign rivals to oust them from the market of the world. No more mistaken notions than these, however, could well be entertained, for they have always taken advantage of the ever increasing demand for engines of this kind, and of the enormous experience which they have systematically gained, and have never failed to avail themselves of everything in the way ot mechanical progress which has been made, and have lost no opportunities of keeping their works rather in advance of the times than in any sense out of date. At the present time they probably have the finest equipment of milling and automatic tools that can be found, and their tool room department also has a specially fine plant. Many of the machine tools have been specially constructed for them to their own designs, and the entire plant is laid down with a view to securing accuracy of workmanship, combined with cheapness of production. The firm have no less than three foundries on the premises, and all the forgings which are used for the engines are made in the works. Some idea of the extent of the works can be gained from the fact that they cover an area of ten or twelve acres, and give employment to between 1,200 and 1,400 men. To some of the special machinery we shall have occasion to refer when describing the construction of the new car, but as an instance of its up-to-date nature we may mention that the large flywheels have their rims turned on both sides, and on the periphery, at the same moment that the boss is being bored out to fit the crank-shaft. The power required in the works amounts to about 1,000-h.p., and is developed by a large number of separate gas engines, each of which drives its own section, using producer gas made on the premises at a cost of about ·08 pence per h.p. hour. It is a particularly happy augury, too, for the success of the Crossley car that the gentlemen who have worked together on its design should have, between them, been able to bring such a wide and varied experience of automobile requirements to bear upon it, for, apart from the question of accurate construction, Mr. Jarrott's knowledge as a driver, Mr. Critchley's close acquaintance with mechanical detail, and Mr. Letts' recognition of the needs of the buying public are all invaluable in such an undertaking as this.

The first standard chassis has just been completed, and this was made the occasion for a very pleasant and instructive function at Manchester—to which we refer in another column—when we were given every opportunity of making a thorough examination of it, and were shown over the entire works. As may be gathered from what we have already said, the Crossley car is certainly one of the best made vehicles which we have ever seen, for the firm have brought their full energies to bear upon the work, and have spared neither time nor expense in laying themselves out for its manufacture. The object aimed at has been to take advantage of

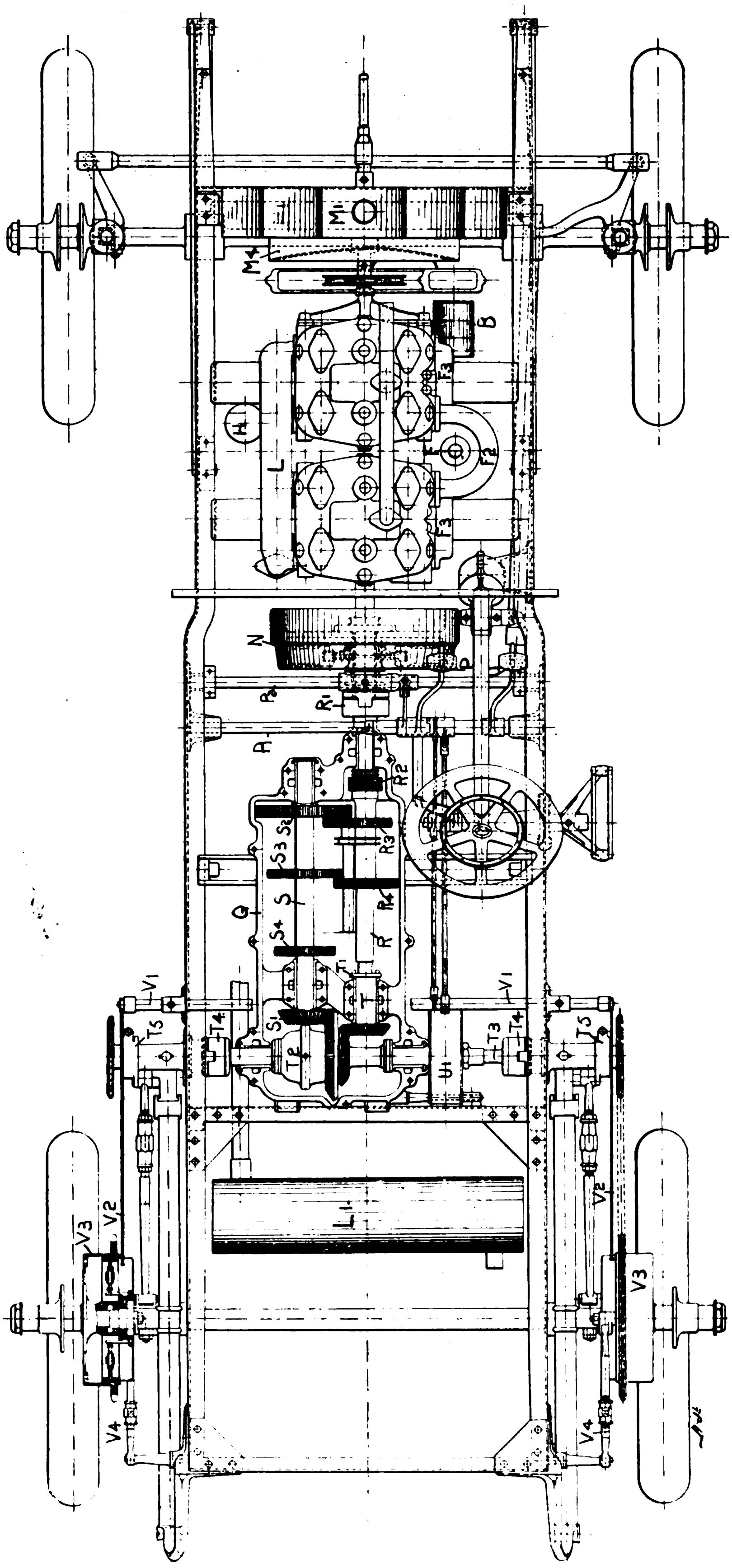


FIG. 2.—Plan of the Crossley Petrol Car, showing the general arrangement of the mechanism.

the best English and Continental automobile experience, to produce a car of the highest grade to suit English roads and English requirements, and to build a vehicle which, although possibly not the lowest in price, should yet be one of the very cheapest in actual value. All parts are made on the "limit gauge" system, and jigs are used to ensure interchangeability throughout. Special provision is made for analysing and conducting physical tests on the materials used, so that they are able to guarantee it and detect any deviation which might otherwise occur. For these reasons the most striking impression which is left upon the mind after such a visit has been paid to their works is that it would be impossible to find a factory which is better organised and better equipped for the construction of any such machinery as that required for an automobile, where high-grade materials, absolute accuracy of workmanship, and true interchangeability of parts are of the highest importance.

The new vehicle does not differ radically in general design from others constructed in accordance with the best European practice, and it is of that type in which the rear wheels are driven by side chains. A side view of the chassis is given in Fig. 1, and a plan drawing in Fig. 2, whilst the rear portion is seen in Fig. 3. A pressed-steel main-frame, stiffened by angle plates at the corners, is employed, and the engine and the gear-box are fixed rigidly and directly to it. It is mounted in the usual way on long, flat, semi-eliptic side-springs, which at the rear lie just outside the frame instead of immediately beneath its longitudinal members. Both axles are very substantial forgings, having an **I** cross-section, and the wheels, which are of the artillery type and very strong, run on plain bearings. The rear wheels are shod with 920 by 120 mm. pneumatic tyres, and those on the front wheels are 910 by 90. The wheel base is 8 ft. 2 in., and the track is 4 ft. 8 in.

The engine, which has four cylinders, is seen from the two sides in Figs. 4 and 5. It is nominally of 22-h.p., but develops about 28-b.h.p. at a normal speed of 900 revs. per min. Its cylinders have a bore of 4¼ inches, and its stroke is 5⅛ inches. The cylinders are cast in pairs, and have unusually large water-jackets around them. The cast-iron used for them is of a harder quality than that generally employed, and the pistons, too, are made of the same metal. A very special feature is made of the piston rings, which are not turned eccentric, but have an equal thickness all the way round, and are turned to precisely fit the cylinder. They are then split, and are placed in a special machine, the patent rights in which are held by Messrs. Crossley Brothers, in which they are subjected to a hammering action which gives them the necessary springiness. When in the machine, they rest in a shallow cylinder, which fits them closely, and is precisely the same diameter as the engine cylinders. A hammer, having a V-shaped head, strikes their inner face with its edge at intervals all round. The force with which it strikes them automatically increases and diminishes, so that the strongest blows are dealt opposite the split, and the blows are gradually decreased in force to nothing at the split. In this way the metal opposite the split is rendered most springy, whilst that close up to it remains in its original condition, the result being that the ring fits its working cylinder exactly.

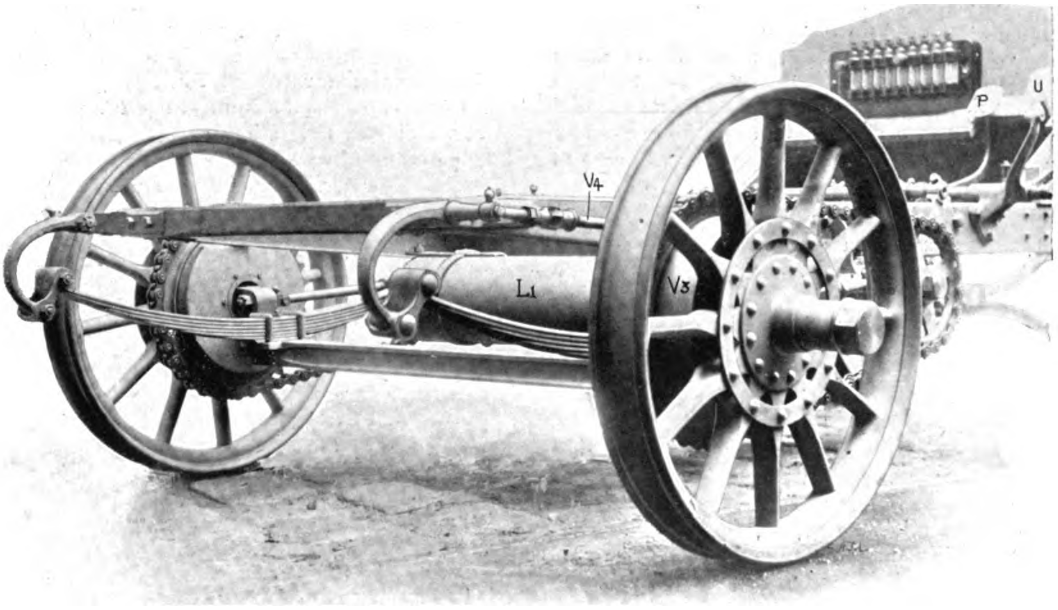


FIG. 3—The rear portion of the Crossley Petrol Car.

The engine has mechanically-operated inlet-valves arranged on the opposite side to the exhausts, and has low-tension make-and-break igniters to form the inspection covers above them. In the particular engine shown, high-tension ignition plugs are also provided, these being screwed into the inspection plugs above the exhaust valve; it is not, however, intended to equip the standard engines with this auxiliary ignition system unless specially ordered. Each cylinder casting is first faced externally, and is then bored in such a way as to ensure the parallelism of the two cylinders. It is then placed inside a box-jig, where it remains during the subsequent operations which have to be performed upon it, the jig ensuring interchangeability of cylinder castings on any engine, and of all fittings on each casting.

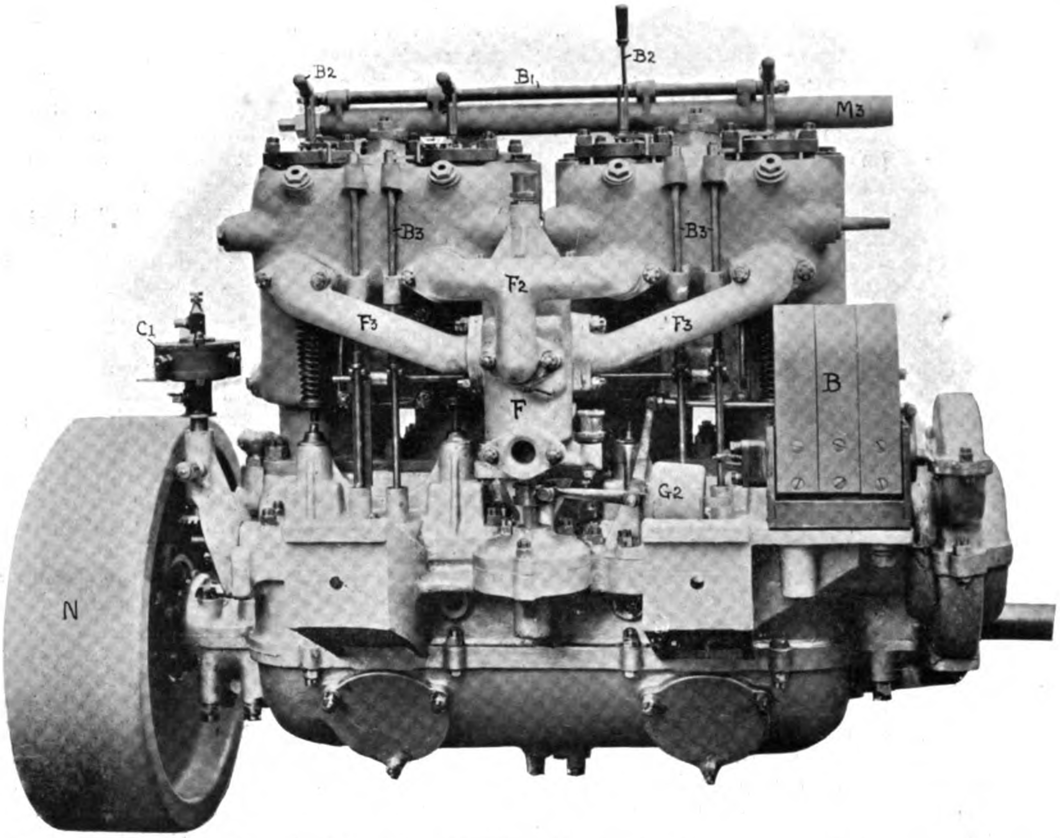


FIG. 4.—The Crossley Petrol Engine from the right (inlet and ignition) side, showing the commutator, the low-tension igniters, the variable-cut-off valve, and the magneto.

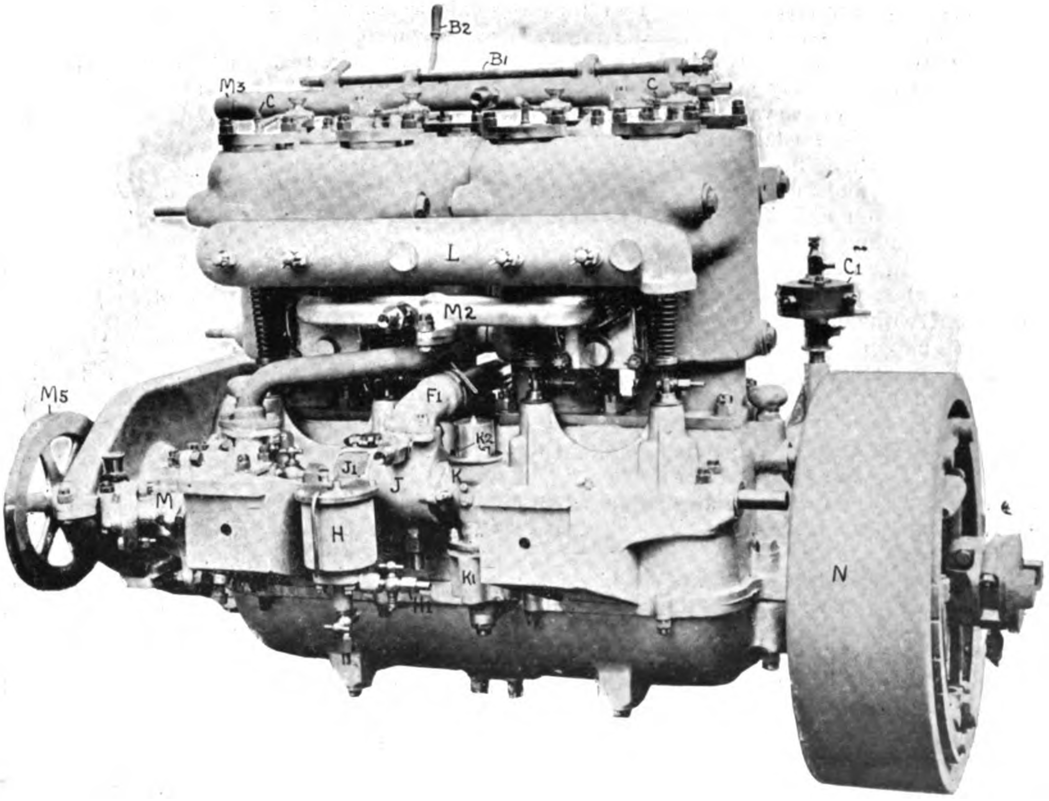


FIG. 5.—The Crossley Petrol Engine from the left (exhaust side), showing the circulating pump, the automatic carburettor, the high-tension igniters, and part of the expanding main clutch.

Nickel steel is used for the crank-shaft, the cam-shafts, the cams, the rollers, the gudgeon pins, and the inlet-valves, whilst the exhaust-valves are made of a very special bronze, which is harder than ordinary crucible steel, will stand a very high temperature, and always remains clean because carbon will not adhere to it; this bronze is an alloy which is made by the firm themselves, and its composition is kept secret. The crank-shaft is mounted in very long bearings, and these, too, are made of a special bronze alloy, which is, in fact, used for the bearings throughout. These main bearings are ring lubricated, and the crank-chamber is constructed with ducts which lead the splashed oil back again to the bearings after it has found its way into the crank-shaft.

Liners which act as register rings, and also "break" the joint, are introduced between the cylinder and the crank-chamber, and also in the joints between the induction and the exhaust pipes and the cylinder castings; those in the mouth of the cylinders also form baffle plates for preventing too much oil from being splashed up on to the pistons. The main bearing at the one end is made in such a way that any oil finding its way out along the crank-shaft, through it, is caught before it can travel to the fly-wheel.

Another interesting detail in design, which is adopted throughout, is that all studs and nuts have a special thread, which is stronger than usual and is less likely to strip. The studs, too, are square between the threads, and the holes in the flanges which fit over them are also square. By this construction, it is impossible for a stud to be screwed out of the casting when an attempt is made to remove a very tight nut, and all risk of breaking a stud off in the casting is practically eliminated. Castle nuts also are used, so that there is no fear of a nut shaking loose. It will be seen in Figs. 4 and 5 that the inspection plugs above the valves are fixed in this way, with square shanked studs and pinned castle nuts, and it is interesting to notice, too, that the flange portions of these plugs do not actually come into contact with the cylinder casting; they have valve-shaped seatings beneath which make a metal-to-metal joint.

The gear-wheels which drive the cam-shafts, as also the cams, are all enclosed, and the governor is contained inside the wheel on the front end of the inlet cam-shaft. The magneto, B, is mounted on the upper crank-chamber casting, as seen, and is driven by a gear-wheel in the same casing. The current generated by it is led to an insulated rod, B^1, which is fixed to the water pipe, M^3, and this rod has chopper switches, B^2, for making connection with the low-tension igniters. The igniters are operated by disc cams on the inlet cam-shaft, through vertical rocking rods, B^3, which can be raised or lowered simultaneously for varying the time of ignition. The commutator, C, for the high-tension system is, when provided, mounted on a vertical spindle and driven by bevel gearing off the rear end of the same cam-shaft.

One of the most novel features of the Crossley engine is the valve, F, seen in Fig. 4, which varies the volume of the charge drawn into the working cylinders. This valve has precisely the same effect as the tapered sliding cams on the Chenard and Walcker engine, for although it always allows the explosive mixture to flow to each cylinder at the beginning of its suction-stroke, yet it cuts off the communication earlier or later during that stroke, and therefore varies the volume of the charge, irrespective of the speed at which the engine is actually running. The cylindrical casting, F, contains a piston valve mounted on a vertical spindle and driven at the same speed as the crank-shaft by gear wheels from the centre of the inlet cam-shaft. This valve, and the casing, have wedge-shaped ports formed in them, and the piston-valve, with its spindle, can be raised or lowered by the governor. The ports are so shaped that this upward or downward movement causes them to cut off the free passage of the gases through the valve, earlier or later, during the suction strokes for each cylinder. The mixture is led to the base of the casting, F, by the pipe, F^1 (Fig. 5), from the carburettor, and is conducted from the cut-off valve to the four cylinders by the pipes, F^2 and F^3, the former of which feeds the two inner cylinders and the latter the outer cylinders. The weight of the revolving valve and its spindle is counterbalanced by the adjustable counterweight, G^2, seen in Fig. 4.

The carburettor, too, is a very special feature on the Crossley car, and ensures a constant degree of richness of mixture whatever may be the speed of the engine, and in spite of widely varying loads. In a general way, the principle adopted may be said to be similar to that employed on the Krebs carburettor, because the quantity of auxiliary air which is admitted to the mixing-chamber, on the engine side of the spray-jet, is automatically controlled by the degree of vacuum formed in the mixing-chamber. This broad principle, however, is made use of in an entirely different manner, and although the device employed is very simple, yet a wonderfully accurate and positive compensating action is secured. The carburettor may be said to consist of four parts:—The float-feed chamber, H, which maintains a constant level of the petrol in the jet in the usual way; the spray-chamber, J, through which the main air supply (entering at J^1) is directed past the jet; the chambers, K and K^1, in which the automatically controlled auxiliary air-valve is situated; and the throttle-valve, which controls the passage of the carburetted air, and of the auxiliary air, to the induction-pipe, F^1. The spray-chamber, J, is water-jacketed, and an adjustable needle-valve is arranged immediately above the jet. A small pipe enters the side of the orifice, close to the jet, so that any suction or injection effect which may act upon the jet also produces a similar effect in this pipe. The pipe is connected externally with the chamber, K^1, in the lower portion of which a wooden float rests upon the surface of mercury contained in that chamber. The chamber is partitioned off around the float by a tube, which nearly reaches the bottom of it, and the mercury is covered with a film of glycerine to prevent it from oxidising or creeping. The wooden float is fixed to the bottom of a spindle, which, at its upper end, carries a piston-valve. The piston-valve is so set in relationship to the float and to the mercury that the auxiliary air-holes, K^1, are closed by the valve when the engine is at rest. The central chamber above the float is, however, connected with the pipe passing to the spray chamber as already explained, and the outer compartment of the chamber, K^1, is at all times in open communication with the atmosphere; when, therefore, any partial vacuum is formed in the spray-chamber and therefore in the float-chamber, the mercury rises in the float-chamber, and in so doing opens the auxiliary air-holes, K^1. By arranging a float on a column of mercury in this way, friction of moving parts forming the automatic device for operating the auxiliary air-valve is reduced to a minimum and a very positive action is obtained, besides which, no springs of any kind are employed. The mercury is prevented from splashing about by arranging steel balls to float upon its surface in the outer compartment of the chamber, K^1, and by constructing the air-vent to this compartment so that the mercury cannot very well find its way through it.

A very large centrifugal pump, M, is fixed to the crank-chamber on the left side of the engine, and this is driven by gearing from the large wheel on the front end of the exhaust cam-shaft. The pump runs somewhat faster than the crank-shaft, and its stuffing-box can easily be got at when necessary for repacking. The front end of the pump-spindle carries a pulley, M^5, from which a belt passes to the fan, M^4, placed behind the honeycomb radiator, M^1. The fan-spindle is mounted in ball-bearings, and the fan itself is fixed to the engine in such a way that the tightness of the belt can be adjusted. The pump delivers the water through the branched pipe, M^2, to the bottom of each jacket, and it is led back by the pipe, M^3, to the top of the radiator.

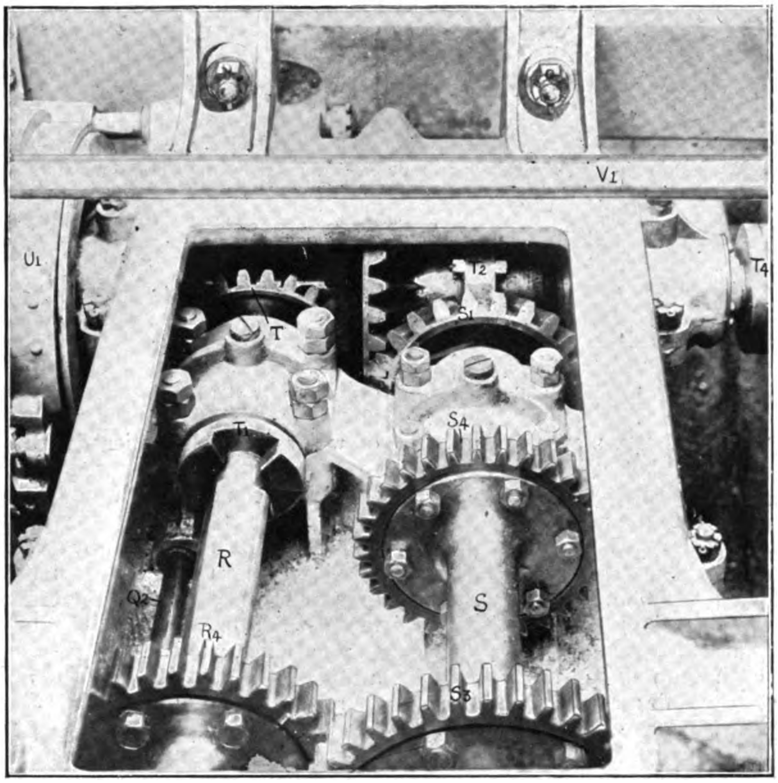


FIG. 6.—A view of the Change-Speed-Gear, with inspection cover removed, on the Crossley Car, showing some of the gear-wheels.

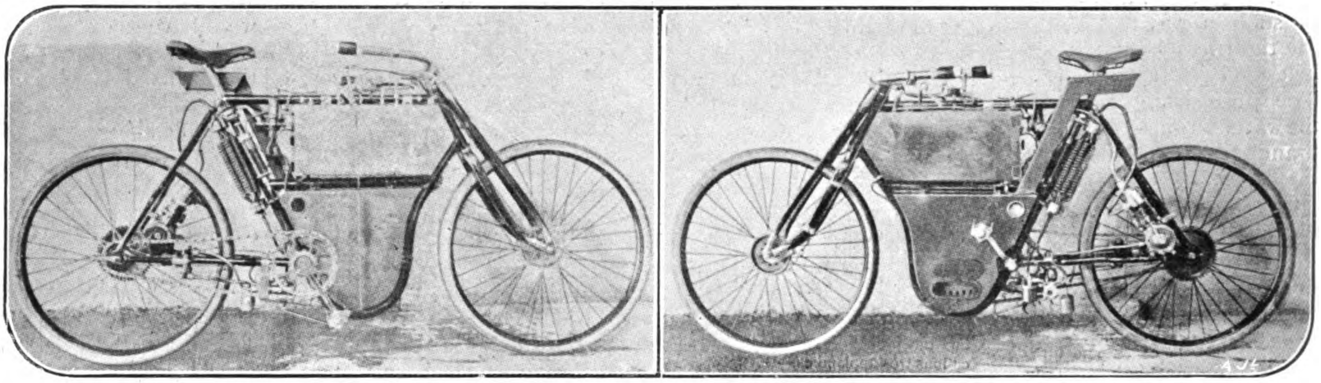
A very neat exhaust-pipe fitting, L, receives the exhaust gases from all four cylinders, and is held in place by four long studs which pass right through it. The gases are led by a single pipe from this fitting to the exhaust-box, L^1, at the back of the chassis.

A special form of expanding clutch is arranged inside the fly-wheel, N; it has metal-to-metal friction surfaces (cast-iron on cast-iron) and is partly closed in to retain a certain amount of oil, and to prevent dust and dirt from getting into it. It is normally held in engagement by an adjustable spring, and provision is made by which any wear can also be taken up when required. A ball-thrust bearing is fitted, although this only comes into operation when the clutch is being disengaged, and even then there is but little end-strain imposed. The shoes are drawn together by a wedge-action acting against the spring, and the collar which slides the wedge is engaged by a fork in much the usual way. The clutch-pedal, P, which is mounted upon the transverse-shaft, P^1, is so shaped that it is pressed forward instead of downward by the driver. The clutch-fork is fitted on another transverse-shaft, P^2, and the connection between it and the clutch-pedal is such that very little pressure is required on the latter to hold the clutch out of engagement when it has been withdrawn.

The change-speed-gear gives four speeds and a reverse, and is of the well-known type first introduced by the Mors Company, bevel gears being introduced to give a direct-through-drive to the countershaft as well as to connect the second-motion-shaft with the countershaft. A portion of the gear is seen in Fig. 6, which is reproduced from a photograph taken looking down upon it after its large inspection cover had been removed. Long, ring-lubricated bearings are employed, and ball thrusts are introduced to take the end-strains imposed by the bevel-wheels. A special grade of steel is used for the shafts and for the gear-wheels, and the wheels are ground true after being hardened. A flexible, jaw-type, coupling is introduced between the clutch and the first-motion-shaft, R, and similar couplings, T^4, are fitted in each half of the differential countershaft. As we have already said, the gear-box is rigidly fixed to the main-frame so that these flexible couplings avoid any straining of the shafts. The ends of the countershaft are carried in ball bearings in the brackets, close up to the sprocket-wheels from which the chains pass to the rear wheels. The engine and the gear-box are lubricated from a special nine-feed lubricator on the dash; three of the feeds pass to the engine, one through ball valves to all four cylinders, and one into the oil trough of each of the end bearings of the crank-shaft. The other six feeds lead to the bearings in the gear-box. The oil is fed under pressure which is derived from the exhaust gases in the well-known manner, and the lubricator itself is fitted with a water jacket through which part of the circulating water is led so as to prevent the oil from becoming too viscous in cold weather.

A double-acting metal-to-metal band-brake is mounted on the countershaft, its band, U^1, being connected with the foot-pedal, U, and the pedal being so arranged that the clutch is withdrawn when the brake is applied. The side-brakes, too, have metal-to-metal friction surfaces, but they are of the internal expanding type, and are entirely enclosed. They are operated by the side lever, V, and are compensatingly applied by a steel cable, V^2, which passes through the transverse rocking tube, V^1; the brakes are of somewhat similar general construction to the main clutch, and lie inside the drums, V^3; the torsional strain on the brake-shoes is taken by the adjustable radius rods, V^4, which at their other ends are pivoted to the main frame at the rear. The steering gear is of exceptionally strong construction throughout, and is adjustable for taking up wear at all the joints. Both the rods which connect it with the steering heads have ball-and-socket joints and small, stiff compression springs, which effectually prevent backlash. The steering gear is of the worm-and-sector irreversible type, and has ball-thrust collars arranged on either side of the worm. The steering pillar itself is hollow, so that a central rod, and a tube surrounding it, can pass down the centre. These are at their upper ends attached to two small hand-levers, which can move over a circular notched ring above the wheel, by which the speed of the engine is controlled. The rod and the tube at their lower ends have screw threads cut upon them, and the correspondingly threaded sleeves, which ride upon these threads, are neatly connected by levers with the parts which they control.

A STEAM MOTOR BICYCLE.



HITHERTO the small petrol motor has held the field for motor bicycle propulsion, so that in the mere successful application of steam for this purpose, M. Espujols has produced a novelty. The Espujols steam bicycle is shown from either side in the two views of it we reproduce from *L'Automobile*, and, as can be seen at a glance, the single-cylinder motor is attached to the rear fork on one side of the driving-wheel, which it propels by the simplest possible form of spur-gearing. The boiler and burner are accommodated in a closed case filling the frame, and arrangements are also made for pedalling the bicycle by the ordinary chain and sprocket transmission.

The steam passes from the top of the boiler to the motor through two throttle valves near the saddle. One is a complete stop valve, and is operated like a brake by a hand lever, being merely employed as an extra precaution, while the other is the throttle by which the speed of the machine is regulated. The motor is of the single cylinder type, with mushroom valves. The dimensions are as follows:—34 mm. bore, 59 mm. stroke, and its speed can be varied from 850 revs. per minute to 1,300 revs. per minute giving at 40 kilogs. pressure, and the lower speed, approximately 2-h.p. From the motor, the steam passes to a surface condenser of multitubular construction, the tubes being coiled as seen behind the seat pillar. After leaving the surface condenser the condensed water passes into a cylindrical vessel immediately behind the bottom bracket, from which it is pumped back into the boiler. On the way to the pump the water passes through a filter for removing any cylinder oil it may contain. The level of the water is kept constant, as far as possible, in this vessel by means of a float feed, which controls the flow to it from the supply tank. The water is drawn from this vessel by a pump, and is delivered by it to the boiler. A hand controlled by-pass is introduced into the delivery pipe, by which the quantity of water fed to the boiler can be varied by the driver, to control the steam pressure. The water tank and the petrol tank are mounted immediately beneath the top tube of the frame, the required pressure in the petrol tank being kept up by a hand pump. The pump for supplying the air pressure to the petrol tank is mounted in front of the steering handles, just above the top of the front forks.

The boiler, which is of very special construction, is arranged inside the casing immediately under the petrol and water tanks. The boiler is of a type suitable for use with any kind of steam engine, though, owing to its lightness, it is particularly suitable for bicycle propulsion. It can be very easily taken to pieces, is very light, and gives great heating area. It is of the flash type, but consists of a number of double steel tubes—that is to say, each tube consists of two concentric cylinders, down the centre of which the water is led in, while the steam is generated in the space between the inner tube and the outer one, this space containing a number of baffles. We are not at present in possession of any particulars of the burner, but understand that it is adapted for using either heavy or light oil. The total weight of the vehicle ready for the road is 48 kilogs., the wheels are 650 mm. in diameter, 2·3 litres of water are carried, and 5·3 litres of fuel. The total consumption of fuel per 100 kiloms. is said to be 2·5 approximately. The bicycle is usually started by pedalling, in order to remove any water from the cylinder.

THE Hon. C. S. Rolls has been asked to stand for the Fulham constituency of the London County Council in the coming election.

MR. W. H. HAMSHAW, of Wimbledon, has been elected president for the ensuing year of the Institute of British Carriage Manufacturers.

RECENT DEVELOPMENTS OF THE PEDRAIL.

(*Concluded from p.* 94.)

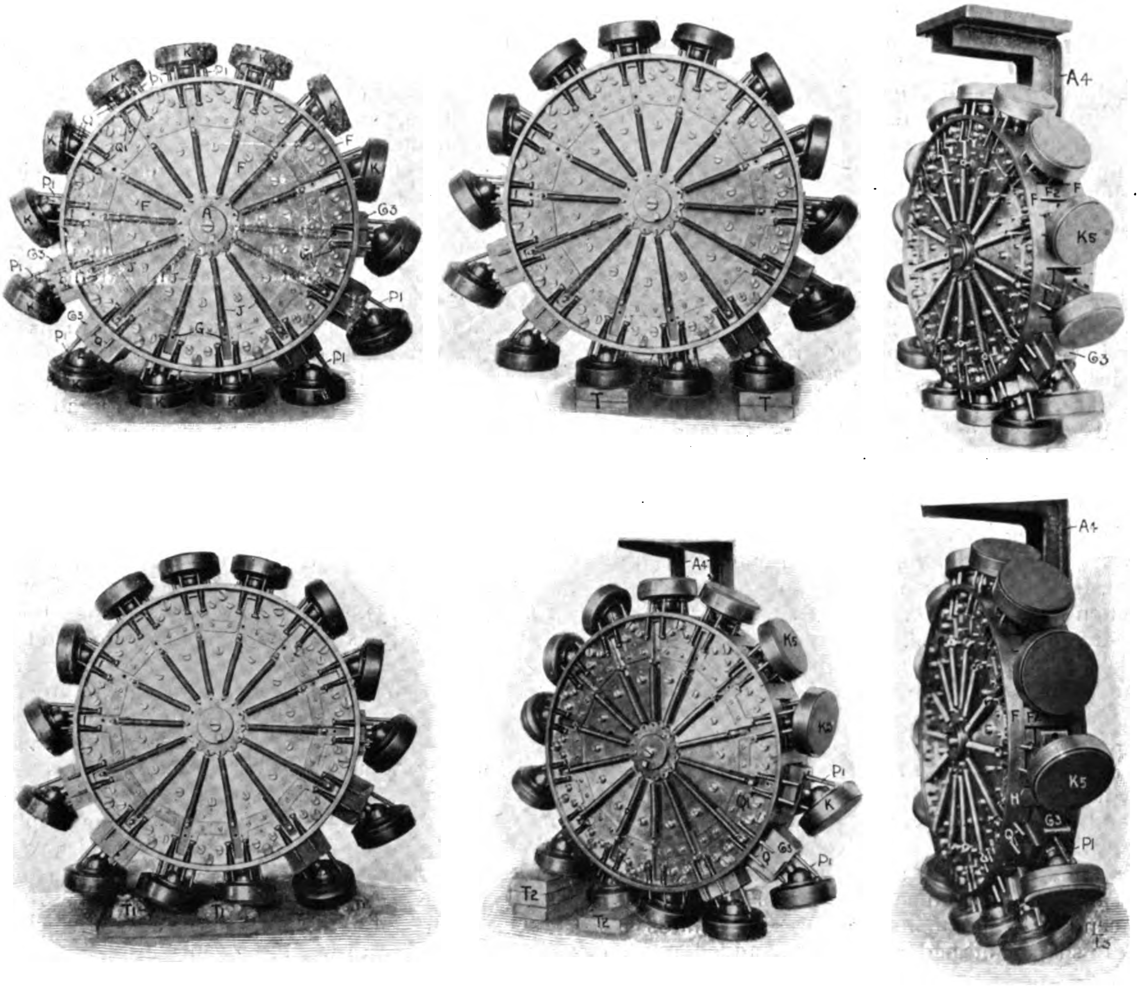


Fig. 10.—Six different views of the No. 3 Pedrail Model, showing the peculiar contortions of which the feet are capable.

In the latest design, the spoke itself has a **U** cross-section, and the rollers, M, as also the rail, D, lie inside it. The pins, G^1, upon which the rollers are mounted, are supported at each end close up to the rollers, and the front projecting portion of the spoke is enclosed by a light sheet metal casing, G^3 A by no means unimportant feature of the design is that any spoke, complete with its ankle and foot, can be entirely withdrawn at any time, even when the machine is on the road. It is only necessary to remove the brackets, G^2, which connect the springs, J, with the spoke, and it can then be withdrawn, and a new one substituted. This operation can, we are told, be performed in about a minute and a half; the risk of any serious breakdown can be, in consequence, reduced to a minimum by carrying a spare spoke fitted with its roller and foot, because no other portion of the mechanism can be regarded as at all complex, or is liable to give trouble in actual practice. The actual strength of the springs, J, is such that a man can easily stretch them to the required extent when replacing them.

The feet, K, are in all cases attached centrally to the ends of the spokes with a universal joint, so that they can lie flat on the road whatever the nature of its surface may be. The peculiar contortions of which they are capable in actual practice is well shown in Fig. 10. In the first of the six views, three of the feet are resting flat upon the road, and the foremost of them will be lifted clear of it just before another foot comes down. In the next view, the central foot at the bottom is hanging in mid-air, because those on either side of it are engaged in stepping over from the block, T, to the other block, T, this being equivalent in practice to stepping across a ditch. In the third view the model is in the same position as in the first, but it is seen obliquely, and shows various portions which are not visible in the other views. In the fourth photograph the Pedrail is negotiating an abnormally rocky road, the obstacles, T^1, in which are causing the three feet to tilt over at totally different angles to one another, and yet each of them is obtaining a firm support for its spoke and its roller. The obstacles, T^2, in the next view show the way in which the model can walk up or down stairs, and here it will be noticed that it is quite immaterial whether the pitch of the steps happens to conform with the stride of the feet or not, for one of them is partly resting on the lower step and partly on the ground. The last view of this series shows the model on a road having a very steeply sloping cross-section, but it will be noticed that the Pedrail itself is standing vertical, and the feet slope over to lie flat on the ground. In these models the framework, A^4, represents a portion of the vehicle body, and is arranged above the model to enable heavy weights to be placed upon it; this framework is of course rigid with the sleeve marked A in Fig. 7.

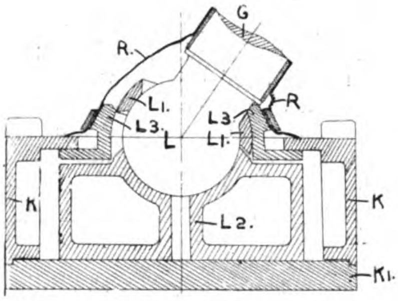
The construction of the feet in the various designs is shown sectionally in Figs. 11 to 15, Fig. 11 being the original foot on No. 1, and Fig. 12 the foot and the spoke which were afterwards substituted. Figs. 13 and 14 represent the foot with its spoke on the No. 2 Pedrail —the latter being reproduced from a photograph—and Fig. 15 is the latest design. In all of these the ankle is formed by a ball, L, which fits down in a socket formed in an internal casting, L^2, and is surrounded on its upperside by a free intermediate ring, L^1, which in turn fits inside an upper socket, L^3. The casting, L^2, has a large flat face on its underside, and is normally self-centred inside the foot, K, by three, equidistant, radial springs, L^6, which are fitted about the pins, L^5, between it and the foot. The upper portion of the socket, L^3, is formed with a flange lying inside the foot, providing another flat bearing surface for the universal joint in it. The universal joint, therefore, lies normally in the centre of the foot, but its socket can slide to a certain extent in any direction inside the foot. In Figs. 13 and 15 it will be noticed that a plate, L^4, is fitted outside, between the socket, L^3, and the foot, to render it dust-proof, and to receive the lower part of the dust-proof casing surrounding the ankle. In the first design the plate, K^1, which was bolted to the foot, formed a metal sole for the Pedrail to walk on, but in the remodelled foot (Fig. 12) and in the subsequent designs, either wood or rubber, or a combination of both, were fitted beneath it.

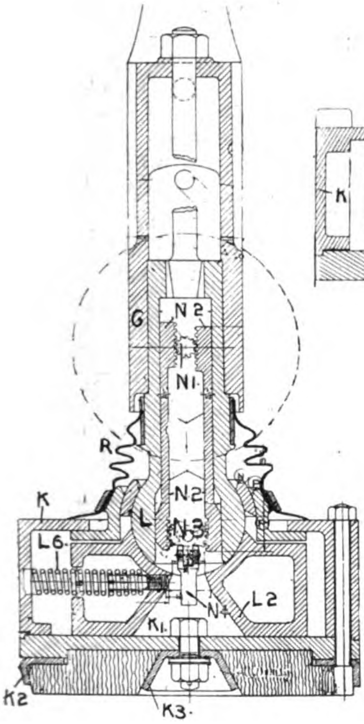
The first foot made (Fig. 11), which was 9 inches in diameter, and gave a distance of 3⅞ inches from the base to the centre of the ankle joint, was afterwards re-designed in shape, and had a rubber sole added as seen in Fig. 12. The diameter of the new foot was 8½ inches, and the height of the centre of the ankle-ball from the ground was 5¼ inches, the rubber being even thicker than shown in the illustration. With this foot, sixteen of which were fitted on Pedrail No. 1, the horizontal pull of the engine, which practically comes on the centre of the ball, caused it to tip over when the engine was pulling a load of 60 tons, thus limiting the utility of the engine to this load. To avoid this trouble, the feet on No. 2 Pedrail (Fig. 13), were made larger in diameter and not so high, these being 11 inches across the tread, and having the centre of the ball 4 inches from the ground. Fourteen of these feet were fitted, and they have never shown any sign of tipping under very severe conditions, but, being used on the engine having No. 1 Pedrails in front, they could not, consequently, be tested much beyond the point at which the other feet ceased to lie flat on the road. The feet on No. 2, which were originally soled with a combination of wood (K 7) and rubber (K 5), were afterwards altered to rubber only. The latest feet (Fig. 15) are the same diameter as those on the No. 2 design (11 inches), but the ankle is even nearer to the ground, the height of the centre of the ball being 3¼ inches instead of 4 inches; the result of the tests, which have already been made on the existing engine, appear to confirm Mr. Diplock's belief that no difficulty will be experienced with them from any tendency to "tip" in practice. It was found, in the early experiments, that the rubber pads were apt to roll out of their sockets, and, therefore, the rubber, K^5 (Fig. 15), is now made in six segments, divided by radial wood strips, K^6, which are wedge-shaped in cross-section, and are, together with the rubber, held in place, centrally, by the cone, K^3, and around the periphery by the steel ring, K^2. Iron liners are fitted on each side of the wooden strips, and a similar (split cone) liner, K^4 (Fig. 18), is introduced between the rubber and the cone, to prevent distortion of the rubber when tightening up. This latest arrangement has been very severely tested with satisfactory results, and has many advantages. The rubber eases the concussion of the foot on the ground, and after it is compressed to a certain extent, the steel and the wood also help in taking the strain of the pull. It is important to notice that the conditions under which the rubber is called upon to act renders it possible to employ quite a cheap grade of material in comparison with that which is necessary for an ordinary rubber tyre. Another interesting fact which has been brought to light by the experiments already conducted, is that the rubber pads always remain comparatively clear, however muddy the road may be, and are in this respect quite different from a wood sole, which picks up the dirt very readily.

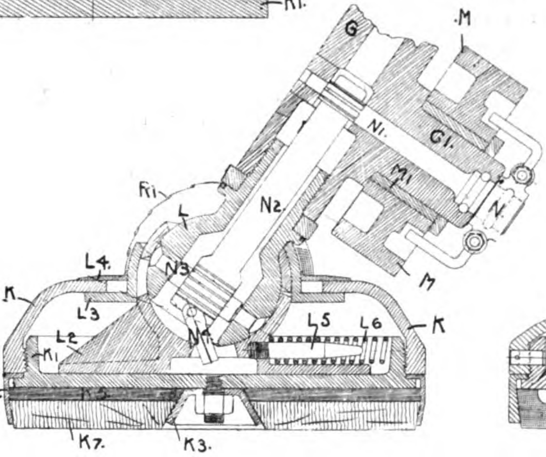
The construction of these more recent feet (Figs. 13, 14, and 15) deserve further passing reference, because the various parts forming them are held together and are locked in place in a very simple manner. The two portions of the socket for the ankle are held in position between the casting, K^1, and the main portion, K, of the foot by screwing the former into the latter, and pinning it after it is adjusted. The steel ring, K^2, is also clamped between these two portions, so that it too is held firmly in place by the same operation. The rubber sole is afterwards inserted, and any section of it can be replaced separately by merely detaching the steel cone, K^3.

Obviously one of the greatest difficulties which had to be contended with was to prevent dust and mud from finding its way into the ankle joint. This was originally guarded against by fitting a leather casing, R, around it, and fixing this in place, as seen in Figs. 11 and 12. The leather, however, soon became broken, owing to the acute angle at which it was doubled up, and to the constant disintegrating action to which it was thus subjected. A special metallic cover, R^1, which is appropriately termed a "crustacean" joint, was therefore adopted on the second Pedrail, and this is seen in Fig. 13 and, on a larger scale, in Fig. 16. It consisted of six spun rings which had their edges slit and bent over outwardly at R^2, and inwardly at R^3, alternately, so that they engaged with one another, and the rings were able to slide over each other without ever coming apart. This design was very satisfactory in practice, but extremely expensive to make, owing to the amount of skilled labour required. A new form of crustacean joint, which is quite cheap to construct, has now, however, been devised, and this has but four rings, arranged as seen in Fig. 17. The two upper rings, R^5, are both moved over, one after the other, by the neck above the ball, L, as it comes into contact with them, but the third ring, R^6, is not pushed over by the neck of the ball, because if it were there would be a risk of its being jammed on the nearly vertical surface of the fourth ring, R^7, which is fixed to the socket, L^3. The ring, R^6, is instead picked up on the other side by the ring, R^5, immediately above it, the upper edge of the ring, R^6, being bent outwardly to

FIG. 11.







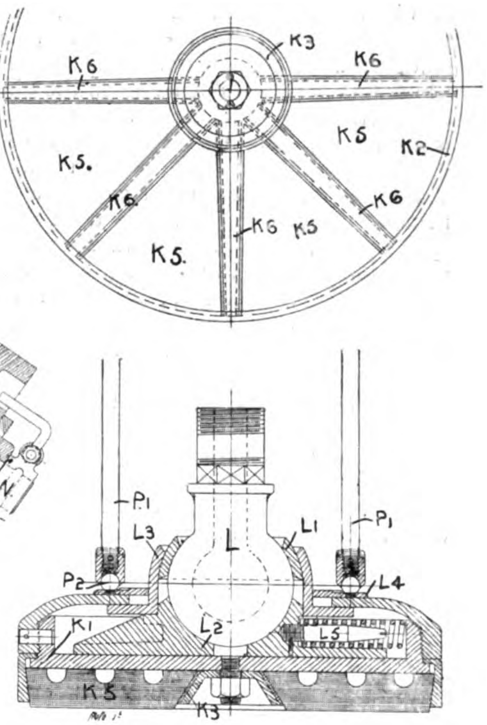


FIG. 12. FIG. 13. FIG. 15.

Sectional drawings of the feet on the various Pedrail designs.—Fig. 11, the original No. 1 foot. Fig. 12, the altered foot on No. 1. Fig. 13, the foot arranged in conjunction with the friction clutch on No. 2. Fig. 15, the No. 3 foot shown in plan and in section.

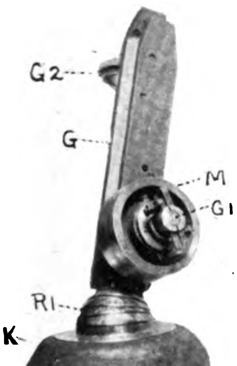


FIG. 14.—One of the actual feet with its spoke, roller, friction clutch, and crustacean joint, used on the No. 2 Pedrail.

engage with the inwardly projecting edge of the other ring for this purpose. The first crustacean joint was attached at the top by the rubber washer, R^4, and was fixed at its lower edge to the dust cap, L^4. The latest crustacean joint is similarly held by a rubber ring, R^8, above, and its lower member, R^7, fits round and is secured to the upper socket casting, L^3. These crustacean joints appear to serve their purpose extremely well, and, together with the sliding cap, L^4, effectually keep the ankle clean. In the first design (Fig. 13), gravity was relied upon to rock the feet over about their ankles as they were approaching the ground, and so cause them to come down flat instead of on their edges. It was partly for this reason that the ankle joint was arranged so high above the ground. It was found, however, in practice that the centrifugal force more than counterbalanced their weight, and that they did not meet the ground properly. It was, therefore, necessary to introduce some mechanism by which the feet would be turned over as they approached the ground, and held at the required angle at this moment. The feet and the spokes were consequently altered, as seen in Fig. 12, the ankle-ball,

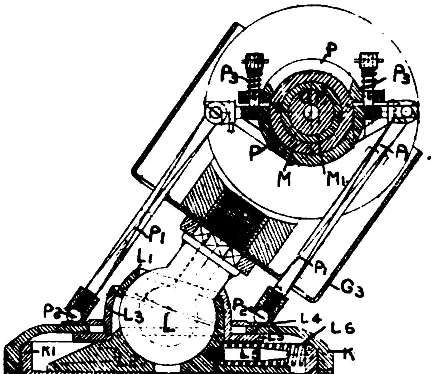
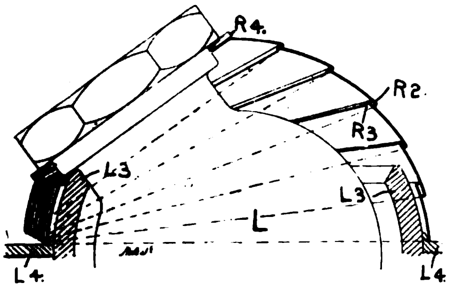
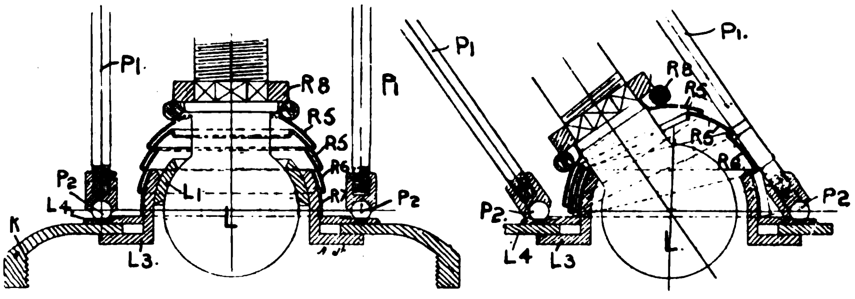


FIG. 18.—Sectional drawing showing one of the feet arranged in conjunction with its friction clutch on the latest form of Pedrail.





Drawings showing the development of the crustacean joint for the ankles of the Pedrail.—Fig. 16, the 6-part joint fitted to the No. 2 design. Fig. 17, two views of the improved 4-part joint for No. 3 design.

L, being bored out for the mechanism to pass through it. It will be noticed that the rollers, M, are caused to revolve as soon as they are brought in contact with the guide surfaces, D^2, of the rail, and that the direction in which they revolve depends upon the direction in which the Pedrail is travelling. This movement of the rollers is ingeniously made use of for giving the required tilt to the feet, and for this purpose a slipping friction clutch is arranged in conjunction with them, and is connected with the feet. This was done in the No. 1 and No 2 Pedrails in a somewhat complicated manner, which will be readily understood by referring to Figs. 12, 13, and 14. The pin, G^1, upon which the rollers, M, were mounted, was bored out to receive a spindle, N^1, which passed through it and the spoke, and carried a small pinion inside the spoke. The outer end of this spindle had a small brake-drum formed on it, around which a pair of brake shoes, N, were mounted; these shoes were held together by springs so as to press upon the drum, and they engaged with the roller, M, so that they were compelled to rotate with it. The shoes, N. in turn tended to rotate a spindle, N^1, and its pinion engaged with a pair of toothed racks, N^2, which at their lower ends, inside the ball, L, engaged on either side of another pinion, N^3. This lower pinion, N^3, carried a pivoted finger, N^4, which projected through a hole in the centre of the socket casting, L^2, and therefore engaged with it. By this device the foot, K, was rocked over by the pivoted finger, N^4, as soon as the roller, M, was caused to rotate by coming in contact with the rail guide, D^3. The pivoted fingers, N^4, gave a considerable amount of trouble at first, and kept on breaking during successive trials, until the cause was ascertained—they worked all right when the friction clutches were turning the feet, but they jammed when the foot was turning the friction clutches, *i.e.*, when the foot was on the ground. Ultimately this was found to be due to the racks and pinions having been a little too closely fitted, and since this was put right no trouble has been experienced with them.

The clutch mechanism on the No. 3 Pedrail is of very simple construction, and is undoubtedly a very great improvement on that which we have just described. This is clearly shown in Fig. 18, where it will be noticed that the friction shoes, P, are mounted centrally between the two wheels forming the roller, M, and that they are normally held together by adjustable springs, P^3. The lower shoe, P, has projecting arms on either side, and rods, P^1, are hinged to them. These rods at their lower ends have cup-shaped sockets screwed upon them, and the sockets rest upon small balls, P^2, which are fixed to the dust-cap, L^4. Precisely the same effect is obtained in this design as before, but there are no delicate or inaccessible parts to get out of order, and the friction-clutch is connected with the foot in a very direct manner. The small balls, P, are arranged so that their centres are in line with the centre of the ankle ball, L, and thus the foot can tilt over sideways without straining the clutch mechanism, and without moving the clutch. The angle to which the feet are rocked over by the clutches is such that the "toe" comes down first, thus tending to make the vehicle walk more quietly. This is particularly important on Pedrails used as drivers, and is ensured by screwing down the friction-clutches more tightly, so that the action of the clutch is to press the toe into the ground. The result of this on soft ground is to make the drive of the engine press the soles of the foot backwards against the ground like paddles. The extra tension on the clutches causes a little more friction to be introduced, but this is more than compensated for by the improved grip obtained, and would be immaterial on a hard road because the power required would then be below the full hauling power of the engine. When the Pedrails are used as trailers, however, the clutches are only tightened up sufficiently to ensure the feet coming down flat on the ground, at any speed.

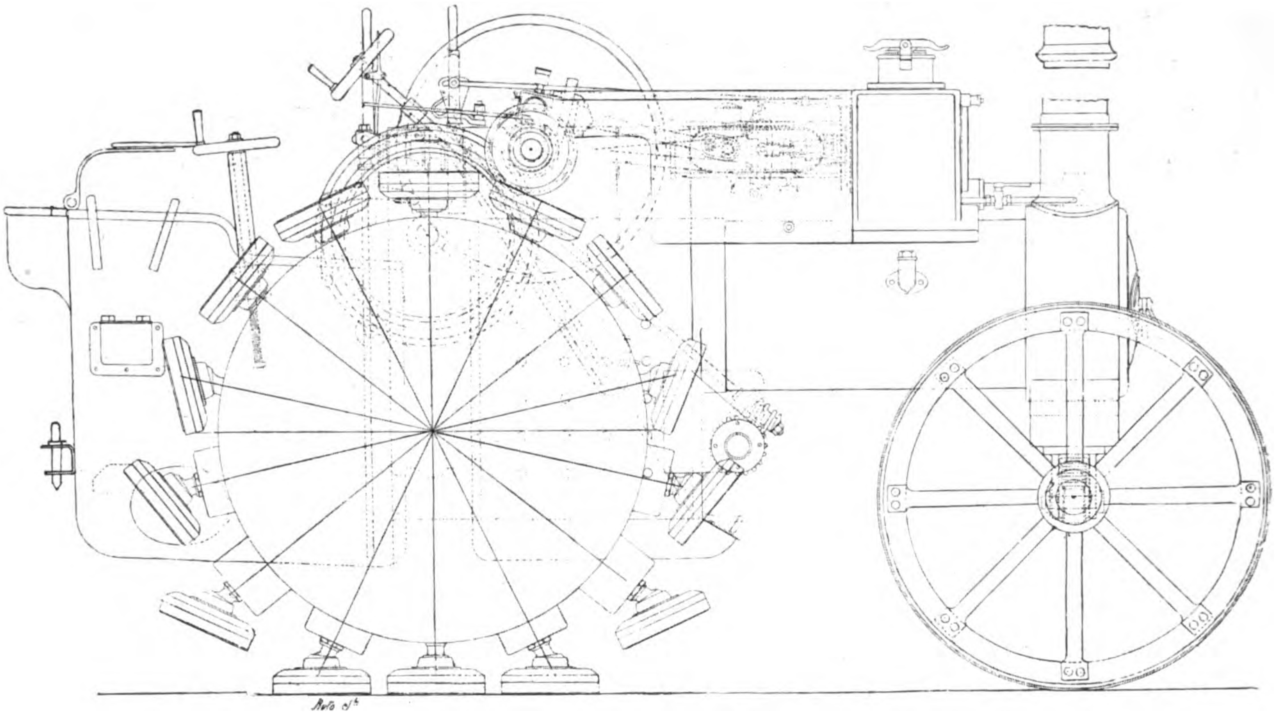


FIG. 19.—The first commercial Pedrail vehicle, which is now in course of construction. This particular traction engine has ordinary wheels in front.

Except in the first design, the feet are prevented from tipping over as they pass over the top of the Pedrail by four small pins, Q, between which and the discs, F, small springs, Q^1, are introduced. When the spokes are allowed to slide inward, they come into contact with these pins, and are held square with the spokes by them, as they are carried over from the front to the back.

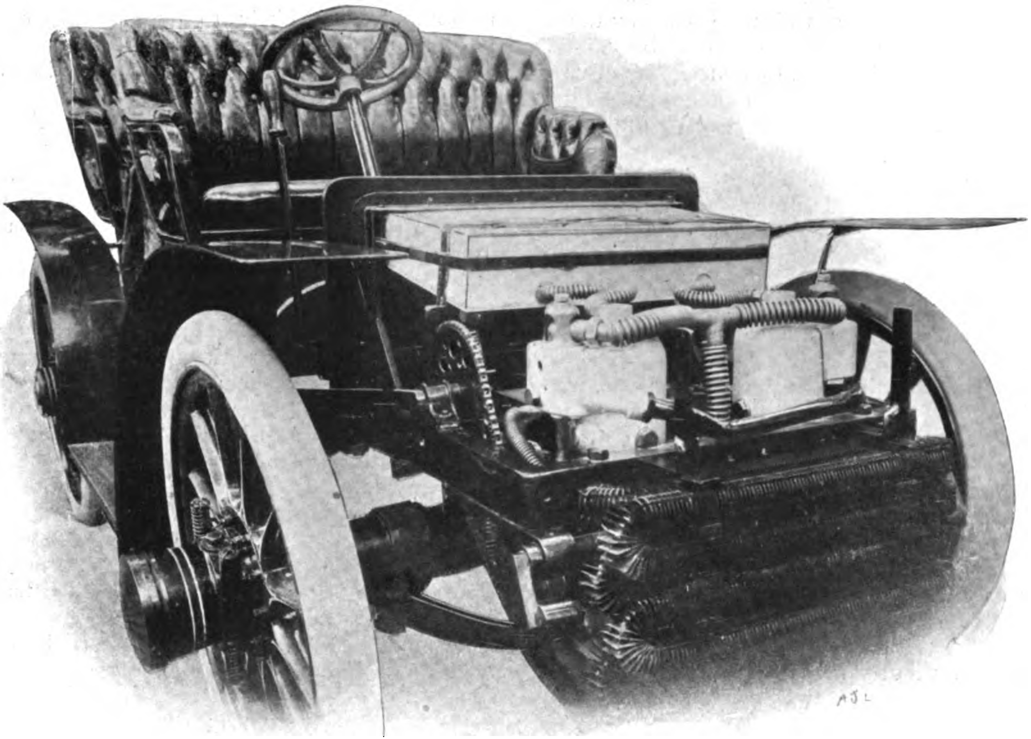
The question of lubrication is, of course, one of very vital importance, and has received careful attention from the inventor. All the moving parts, except the joints in the feet, are fed with oil from a central annular chamber, S, on the outer side of the hub. This chamber needs filling occasionally, and the oil is led from it by cross-tubes to another oil ring, S^1, which lies between the outer disc, F, and the bracket, A^1. The cross-tubes have left- and right-hand threads at their ends, and are fitted in place by a square key which can be inserted through openings in the outer annular chamber, S; the caps which screw into these openings afterwards serve as filler-caps. The oil is led from the inner ring. S^1, into fourteen radial tubes, S^2, which are fixed to it, and fit inside corresponding tubes, S^3, which at their outer ends are secured to the pins, G^1, on which the rollers, M, revolve. The telescopic joints thus formed have small stuffing-boxes between the tubes to prevent leakage, and the pipes act as pumps, which keep the oil on the move (pulsating) as the spokes slide in and out. The oil is thus conducted to each of the pins, G^1, and these pins are hollow to allow it to pass through them to the rollers, M, and to the guides for the spokes. The oil-ways through the pins, G^1, are filled with loose cotton wicks to prevent the oil from flowing too freely to the rollers, the friction clutches, and the guides, and the outlets are plugged with special plaited wire and cotton. The feet are filled up inside with a mixture of tallow and black-lead, which appears to answer admirably, and to last for a very long period without requiring any attention.

The new traction engine (Fig. 19) was designed and is now being built by Messrs. Wm. Foster and Co., of Lincoln, who also made the No. 2 pair of Pedrails for Mr. Diplock. This is the first standard model to be put up on the market for commercial use, and has but one pair of Pedrails instead of two pairs. It is expected to be capable of hauling very heavy loads—25 tons gross under average conditions. It will weigh about 5 tons, of which 1 ton will be taken by the front wheels, and the remainder by the Pedrails. The front wheels will have 9-inch tyres with 5-inch bands shrunk on them, so that the wheel will run on the bands on good roads, and will have the extra width available for soft ground, where each 9-inch tyre will easily support a weight of only half a ton.

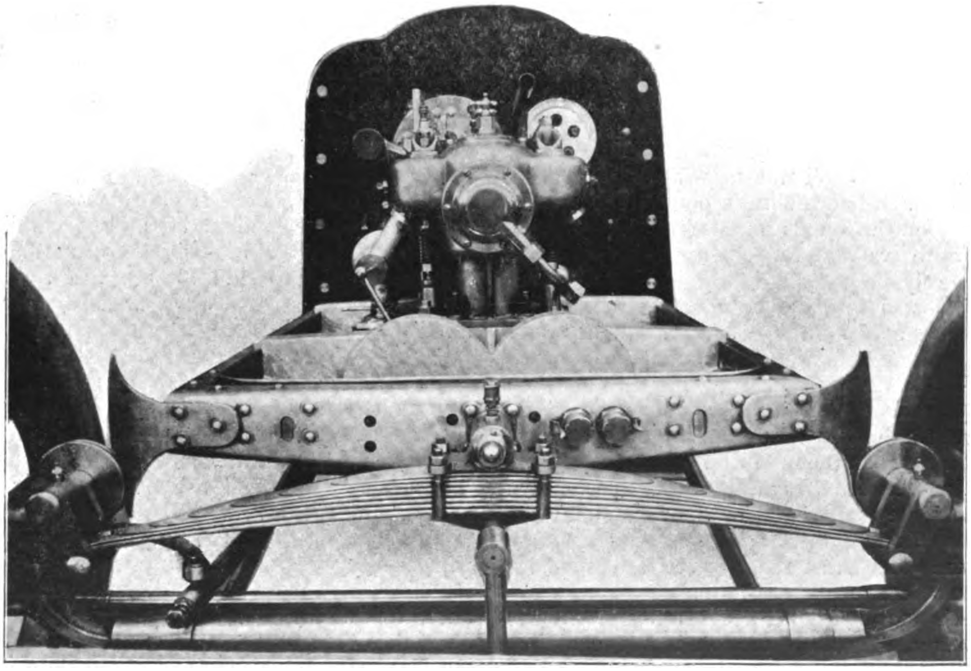
One of the most important characteristics of the Pedrail is that the actual rolling action, which must necessarily take place somewhere between the vehicle and the road, does not take place on the surface of the road, and that the rolling parts do not need to have sufficient adhesion for the propelling power to be transmitted between them. In all ordinary traction systems the friction between the wheels and the stationary surface over which they run requires to be as slight as possible so far as efficiency in carrying the load is concerned, but on the other hand, there has to be sufficient friction between them on a self-propelled vehicle to enable the wheels to obtain the necessary grip. With the Pedrail, however, the rolling motion is between the rollers, M, and the rail, D, and there is no tendency for slip to occur between these parts, nor would the engine race if there were slip. The rollers and the rail, therefore, carry a self-propelled vehicle as though it were merely a trailer, and the weight of the vehicle need only be sufficient to prevent the large flat feet from scraping away the road surface, and failing to secure a hold on the ground. A heavy vehicle fitted with Pedrails is not only less likely to damage the road by sinking into it or by wearing away its surface, but it can, therefore, also haul a greater proporton of its load on trailers than can an ordinary vehicle. For the transport of goods this is a very important matter, because the commercial value of a tractor is considerably reduced if it has to remain idle during the process of loading and unloading. On the score of road damage the Pedrail has considerably more in its favour than that suggested above, for the tendency of the feet when they press upon the road is to stamp down the high places and not to deepen the depressions, thus trampling it down to a flat surface. The suspension of the vehicle fitted with Pedrails is even more satisfactory than at first sight appears, particularly with the arrangement of the springs adopted in the No. 3 design. In this arrangement the two inner springs, E^4, carry a quarter of the total weight between them, and the two outer springs, E, take the remaining three-quarters. The remarkable result obtained by the compound-lever action, which we referred to earlier in this article, is that the axle, C, remains at the same distance from the ground, when the rail, D, is deflected from the position shown in Fig. 6 to that shown in Fig. 8, which means that the obstacle on the road is being mounted, although the vehicle itself has not been raised. In Fig. 8 it will be noticed that one of the springs, E^4, is compressed roughly to the same amount as the height of the obstacle, but that the outer springs, E, are only compressed to half this extent. The springs can therefore work without undue fatigue, any impact with an obstacle is entirely taken up by them, the vehicle slowly rises on its springs as the rollers travel along the rail, and as the Pedrail steps off an object, the vehicle slowly sinks upon the springs after they have taken the initial shock.

The drawbar pull required for hauling a vehicle fitted with steel tyres along the very best of roads is about 50 lbs. per ton, and is more ordinarily about 100 lbs.; it increases enormously if the road is wet, or otherwise in bad condition. A vehicle fitted with Pedrails, however, requires, Mr. Diplock tells us, a drawbar pull of about 35 lbs. per ton on a good road, and the power required does not increase so enormously when the road is in bad condition, or when the vehicle is travelling over soft ground. This is only what might be expected, for the feet remain stationary during the time that they are in actual operation, and they merely serve as temporarily fixed anchors for the spokes to act upon. The frictional losses in the Pedrail are chiefly those occasioned by the sliding of the spokes in their guides, and by their having to slide when at a somewhat awkward angle and when the power is being transmitted to them from the guides. The usual "railway" losses also occur between the rollers and the rail, and between the rollers and their pins. This is undoubtedly exaggerated to a certain extent—though relatively insignificant—by the friction clutches which are at all times operative and are retarding about half of the rollers. A certain amount of friction also takes place in the ankle joints and in the sockets in the feet. It should, however, be pointed out that the weight of the vehicle is not imposed upon the bearings between the discs (G) and their stationary sleeve (A).

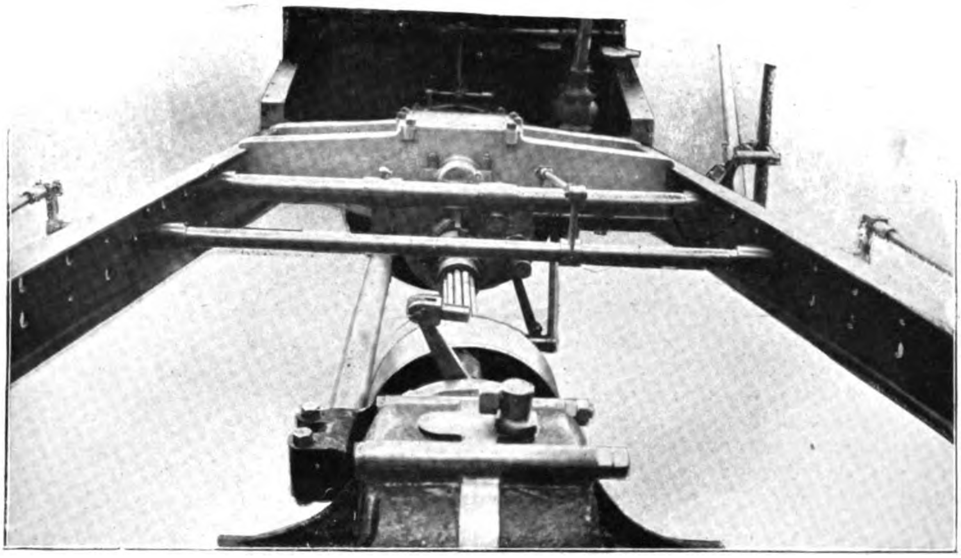
THE BRUSSELS AUTOMOBILE SALON.



BRUSSELS SALON. FIG. 1.—The Lorence Petrol Car, showing the two independent motors mounted in front.



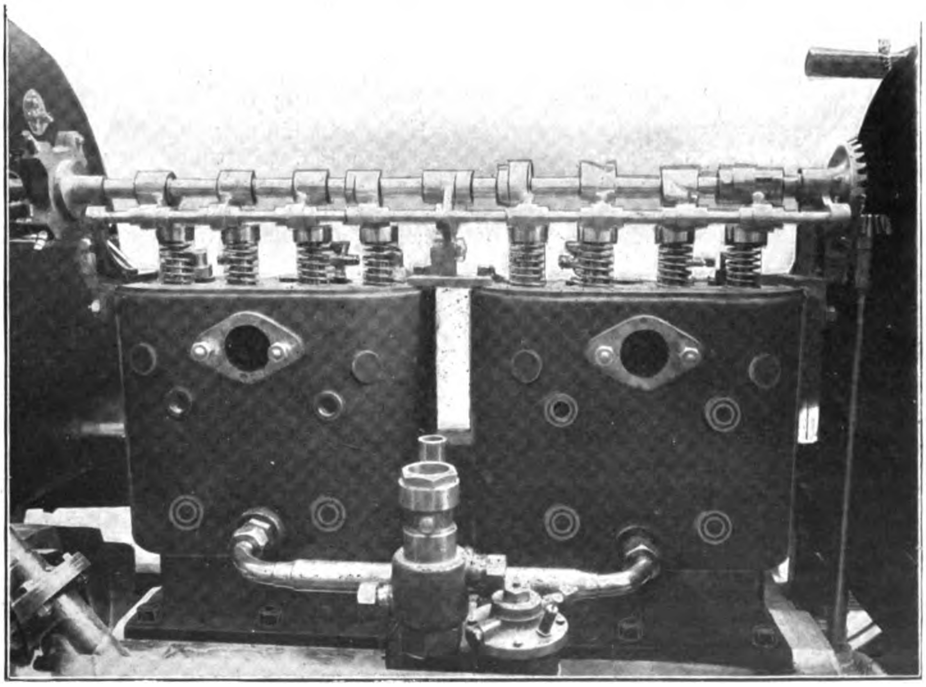
BRUSSELS SALON. FIG. 2.—Front view of the Dasse Chassis, showing the pivoted transverse spring, and the guides on the frame.



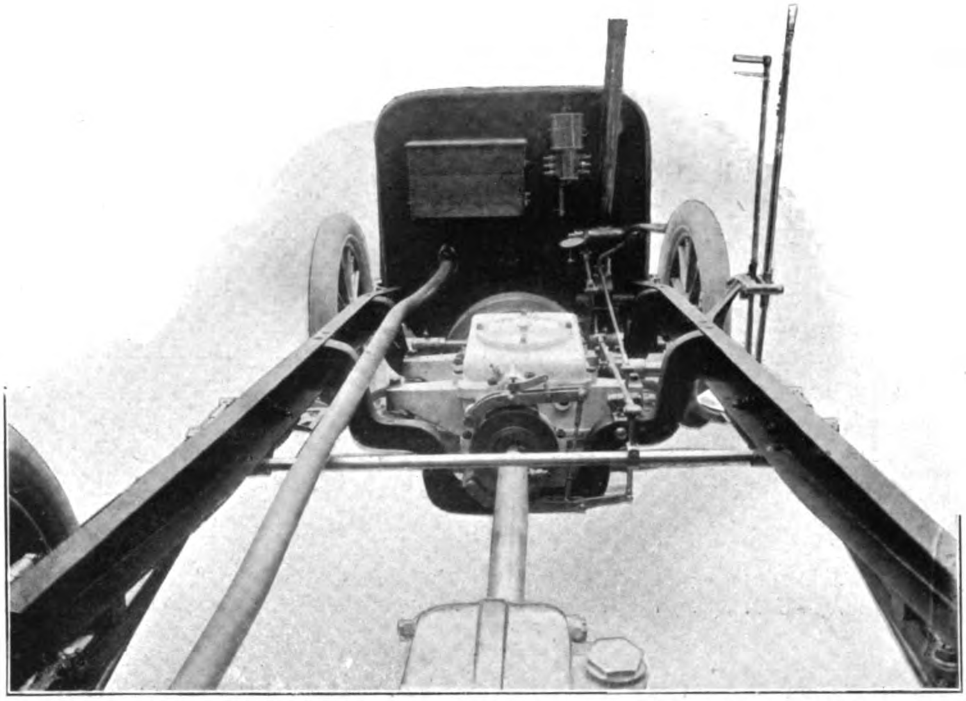
BRUSSELS SALON. FIG. 3.—Central portion of the Dasse Chassis, showing part of the flexible propeller shaft which transmits the power to the live-rear-axle.

ON Saturday last the inauguration of the Third Brussels Salon took place at the Grand Hall of the Parc de Cinquantenaire, the Minister of Industry and Works performing the formal ceremony, assisted by M. De Mot, Burgomaster of Brussels, who has earned considerable notoriety in connection with his famous edict confining the speed of automobiles in Brussels to 5 k.p.h. Every Continental make of automobile of note is represented in the present exhibition, prominent amongst the Belgian cars being the Pipe and the Germain exhibits. The attendance during the week has been phenomenally great, over 10,000 entering on the first day, while during the afternoon of Sunday over 12,000 passed the turnstiles. On Monday, Prince Albert and Prince Victor Bonaparte visited the Salon officially, and King Leopold announced his intention of attending on Friday. Coming so quickly after the Paris Salon, very few novelties which were not seen in Paris were to be observed, but a few were noticeable, and from these we have made the following selection :—

The peculiarity of the Lorence Car (Fig. 1) is that a pair of single-cylinder De Dion engines are mounted in line with one another in front, and have their crankshafts placed transversely across the car. One motor drives each of the front wheels, and thus there is no need for any differential gear.



BRUSSELS SALON. FIG. 4.—View of the engine on the Baudouin Chassis, from the right side, showing the arrangement of the valves and the cam-shaft above the cylinders.



Brussels Salon. Fig. 5.—Portion of the Chassis built by the Soc. Anon. de Mécanique et Moteurs de Liege, showing the method of fixing the gear-box to the pressed steel frame, the positions of the foot pedals, and the exhaust pipe.

The novel features of the Dasse chassis are the arrangements adopted for the suspension in front, and the employment of a flexible propeller shaft. A front view is shown in Fig. 2, and the central portion of the chassis from the rear in Fig. 3. A transverse inverted spring is attached, by shackles at either end, to the front axle, and is pivoted centrally to the pressed steel main-frame in front. The brackets to which the shackles are fixed are also fitted with small grooved rollers, which engage with curved guide-plates on either side of the frame, as shown. The front portion of the car is, therefore, free to move about the central pivot without depressing the transverse spring, the spring merely serving to absorb the shocks sustained by the front axle itself.

The propeller-shaft (Fig. 3) transmits the power from the change-speed-gear to a live axle in much the usual way, but, instead of being a solid shaft, is built up of a bundle of rods, so that a considerable amount of flexibility is introduced by it. The gearing provides three speeds and a reverse, with a direct through-drive on the top speed, and the box is fixed to the main-frame. A single tubular radius-rod is fitted between the differential-casing and the central cross-tube of the main-frame. The engine on this vehicle has four cylinders, the bore of which is 110 mm., and the stroke 120 mm. Mechanically operated inlet-valves are arranged on the opposite sides to the exhaust-valves, magneto ignition is employed, and high-tension ignition-plugs are fitted above the inlet-valves; the gear-wheels on the engine have helical teeth, and the magneto is driven through a helical shaft. The brakes are of the metal-to-metal type, those on the rear wheels being dust-proof; the foot-pedals are fixed to the dash, and the foot-brake is arranged close up to the differential-casing.

The four-cylinder engine, Fig. 4, on the Baudouin chassis has its valves and cam-shaft arranged in somewhat the same way that they are in the Maudslay engine. They are all mechanically operated, and are fitted vertically into the heads of the cylinders, which are cast in pairs. The cam-shaft lies across above them, and is driven by bevel gearing; it also carries the commutator just in front of the dash-board.

The Société Anonyme de Mécanique et Moteurs de Liège exhibit a new chassis, the rear portion of which is seen in Fig. 5. It has a pressed steel frame, and an under-frame for the engine only, the gear-box being supported on two transverse drop-brackets, which bridge across between the two side members. The engine has four cylinders, which are formed by separate castings, and have their mechanically operated inlet valves opposite to the exhaust-valves. The lift of the inlet-valves can be varied by a rack and pinion device in much the same way as on the Mercedes cars. High-tension igniters are arranged above them, and half-compression cocks above the exhaust-valves. The car is of the live axle type, and, as will be noticed in the illustration, the foot-pedals are mounted on the base of the steering-pillar, and the exhaust pipe passes back on a higher level than usual just below the dashboard.

The Portuguese Government contemplate experimenting with automobiles for military purposes. With a view to ascertaining the importance of utilising motor tractors for this purpose, the King of Portugal is personally witnessing at Lisbon experiments showing the adaptability of the tractor system of Eugene Brillié, whose machines are being manufactured by Schneider and Co., of Havre.

BLUFF AND THE SELDEN PATENT.

THE fight in the United States in connection with the Selden patent and other minor patents controlled by the Association of Licensed Automobile Manufacturers is proceeding apace, and there appears to be a prospect of some definite legal decision being come to as a result of the present tactics. For the sake of the general automobile industry it is to be hoped that the attempt to corner manufacturers, both in the United States and abroad, will signally fail, particularly in view of the outrageously flimsy patent on which the main claims are based. Several foreign importers have come into line with the Association and obtained licences for the sale ot their vehicles rather than go to the expense of fighting against the combination. Amongst the latest so admitted are the importers of the Darracq cars and of the Fiat, the representatives of the former having up till that time supported the independent Automobile Association. Probably these two new privileges will end the granting of licences to importers, and serious objection has even been raised to these being granted by the Importers' branch of the A.L.A.M. Attempts by wealthy automobilists in the States are being made to get over the blackmailing of the Association. For this purpose it is stated that a group of about a dozen wealthy men have combined to send a representative to Europe to buy automobiles for them direct. The licensed importers, however, are making a counter move to this, and are already formulating plans for preventing the entry through the Custom House of cars not brought in by a licensed importer.

By way of having a second barrel to their gun, the Association are beginning to move in connection with some of their minor patents, and under this policy they are suing the American house of Panhard and Levassor in connection with the Columbia Steering Mechanism, known as the Back Lock Steering Device. The actual patent in this case alleged to have been infringed is one filed in June, 1896, and granted May 6th, 1902, to Hiram Percy Maxim (No. 699543), and another filed in 1897 and issued in June, 1902, to Pope and Maxim (No. 702443). Altogether a pretty kettle of fish appears to be coming to the boil. In the meantime the Ford Motor Company and C. A. Duerr and Co., the first people attacked by the Association under the Selden patent, have filed a very elaborate reply in defence, in which dishonest and fraudulent intent are charged against the methods employed in obtaining the patent, and misrepresentations of a fraudulent character are alleged to have been made to the public with respect to the result of previous litigation in regard to the Selden patent. It is alleged further that the Winton Motor Carriage Company, when they were originally attacked by the Association through the Electric Vehicle Company, were induced by the payment of sums of money by the Electric Vehicle Company to drop the defence and permit a "Consent decree" for infringement to be entered against them, and that the evidence of anticipation of the Selden patent filed by the Winton Company was handed over to the plaintiffs. The defendants in the present suit are now endeavouring to compel this evidence of the Winton Company to be produced in Court. In conclusion, the answer sets forth a list of patents and publications of devices in which it is claimed there are anticipations of every discovery claimed by Selden. This list comprises no less than 140 patents.

CORRESPONDENCE.

*** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letter intended for insertion, or containing queries.*

THE EXHIBITION QUESTION AND THE CLUB.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—We shall be glad if you will permit us to state that the Annual Show of this Society, which represents practically the entire industry in this country, will be held at the Crystal Palace from the 12th to the 24th February next.

With the object of ensuring a thoroughly representative Exhibition, the leading manufacturers and traders, some time back, entered into an agreement to exhibit *only* at the Society's Show.

As a result the whole of the available space at the Crystal Palace has been allotted, and its success assured, notwithstanding the fact that the Automobile Club has decided, for a pecuniary consideration, to give its patronage to another Exhibition to be held at a later date, and at which exhibits from those who have signed the above-mentioned agreement will not be found.

It is not for us to criticise the action of the Automobile Club, but we think it right that the above facts should be made known.

I enclose a list of exhibitors at the Society's Exhibition, showing those who have agreed not to exhibit elsewhere.

I am, Sir, your obedient servant,
T. F. WOODFINE,
Secretary, Society of Motor Manufacturers and Traders.

To the Editor of THE AUTOMOTOR JOURNAL.

DEAR SIR,—I was astonished to read in *The Automobile Club Journal* that at a Committee Meeting of the club held on January 18th, it was resolved to *give* the patronage of the club to the Show to be held at Islington in March.

The club rightly decided about two years ago to withhold its patronage from any show until the manufacturers were united, and I now read that the club has not *given* its patronage to any show, *but has sold its patronage* to the Agricultural Hall Show, regardless of whether the leading manufacturers will be there or not. I, therefore, as a member of the club, wonder if we can place any reliance upon its future decisions or awards, unless the Committee immediately acknowledges its mistake and withdraws from its false position. The resolution is grossly misleading to the members of the club, excepting those whose knowledge of motor cars enables them to judge for themselves by reading the list of exhibitors at the Crystal Palace Show that the majority of leaoing manufacturers will be there.

In my opinion the future of the club does not depend upon such trading, but on its social position and its honest help to motorists in general. It can be of great assistance to the trade and the public in an honourable way when asked to award prizes, &c., in trade trials, but I do not think the club should, for a sum of money, take one side or the other in a trade dispute, and I should like to know the views of other members on the trading policy of the club.

Yours truly,
J. M. MACLULICH.

January 26th.

[We publish above a dignified protest from the Society of Motor Manufacturers and Traders referring to the attitude taken up by the A.C.G.B.I. in regard to the Exhibition Question, on which we comment editorially in our front paragraphs. We also print a letter from a correspondent which is a sample of the large number of similar communications we have received on the same subject, not only from members of the trade, but from many members of the Automobile Club itself, illustrating in a forcible manner the strong feeling that the inconsistent action of the club has evoked.—ED.]

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—So many communications of congratulation have reached me during the last few days on the action of the Automobile Club of Great Britain and Ireland in again associating themselves with my Automobile Exhibition at the Agricultural Hall, London, that I am compelled to ask my correspondents to accept this public acknowledgment of their appreciation. They will be interested to know that the eighth automobile display at the Royal Agricultural Hall will be the most representative of the series that has yet been held.

Thanking you in anticipation for the favour of your insertion of this brief letter,

I remain, yours faithfully,
C. CORDINGLEY.

A VISIT TO THE CROSSLEY WORKS.

To christen the Crossley car, which we describe in another column, a goodly company, composed of representatives of the chief automobile journals, assembled last week in Manchester at the newest and most perfectly appointed hotel in Great Britain, to wit, the new Midland. The fact that Messrs. Crossley Brothers, of world-wide gas and oil engine fame, had entered the automobile field was one of national importance, and that alone would have been sufficient attraction to draw towards Cottonopolis all those invited to inspect this new production. The occasion was made doubly important from the fact that in association with Messrs. Crossley in this new departure were Messrs. Charles Jarrott and Letts, and Mr. J. S. Critchley. Such a partnership must necessarily lead to important results, combining as it does manufacturers of Messrs. Crossley's reputation and experience, Mr. Charles Jarrott's practical driving knowledge, Mr. Critchley's intimate acquaintance as an engineer with every move on the automobile board since it received its first real launch into the British world in 1896, and last, but not least, Mr. W. M. Letts's exceptional ability as a successful commercial and business man. Every effort has been made to ensure that the work on the Crossley car shall be of the most perfect type, and the statement was made by Mr. Turner—the director under whose practical control the actual works are run—at the christening lunch held at the Midland Hotel, that his firm were extending their works, at a cost of £30,000, to make room for its manufacture.

A good deal of interesting information concerning the works was also given by Mr. Turner at the same time. No less than 180 tons of iron castings are produced per week, 3 tons of brass and gun-metal castings, 15 tons of crankshaft and connecting-rod forgings, and 4 tons of various small forgings. About 800 engines are at all times in course of construction, and the firm usually have a stock of about 200 finished engines ready for delivery. The output of the works is about 80 engines per week, and they range in size up to those developing 1,000-h.p.: this means that a complete engine is turned out and delivered every three-quarters of a working hour. Gas-producing plants, pumps, and air compressors are also made. Thirty-five large travelling cranes are installed in the various shops, apart from the numerous hydraulic jib-cranes and lifts which are employed for handling the work. Many of the special tools and appliances for cheapening production and ensuring absolute accuracy of workmanship are of the firm's own design and make, and in many cases the alloys used for special parts are prepared in accordance with their own practical experience, and the composition is kept secret. Even the largest engines have their more important moving parts turned true to a thousandth of an inch. The foundries, the stores, the machine shops, the erecting shop, and, in fact, each of the numerous departments is kept quite distinct and under separate control, and indeed a thoroughly up-to-date and excellently organised system exists throughout. During the last six or seven years about £80,000 has been spent in replacing old machines, adding to the plant and extending the works, with the result that the output for last year was 48,900 b.-h.-p., as against 21,600 b.-h.-p. for 1894; the 49,000th engine is now in hand. Referring to foreign competition, Mr. Turner made some amusing remarks with regard to statements which have been made to the effect that engineers in this country are much behind the times, and gave some interesting data concerning the steadily increasing business which is being done with the Crossley engines abroad. At the present time they have on order for America no less than 13 engines, varying in size from 85-h.p. up to 700-h.p., these above giving a total of 4,515-h.p. During an interesting tour round the works, one of the new 700-h.p. gas engines was shown working, and the one half of a large flywheel, weighing 30 tons, was cast in the presence of the visitors in the large iron foundry.

One of the new Crossley vehicles will be on view publicly for the first time at the Crystal Palace Show, opening on February 12th. We wish the very heartiest success both to the manufacturers and to those concerned with them.

ARTHUR J. HERSCHMANN, who has been prominently connected with the Adams Express Company in America, has severed his connection with that firm and assumed the direction of the Commercial Automobile Company, which has been recently incorporated with offices at 45, Broadway, New York. Commercial vehicles, the Herschmann system of steam trucks in particular, will be the feature of the Company.

THE LEGAL ASPECTS OF THE MOTOR CAR ACT.*

By Earl Russell.

So much confusion as to the exact provisions of the Motor Car Act, 1903, and the regulations of the Local Government Board made thereunder appears to exist, that it may not be altogether without interest to consider them in detail.

The first section penalises reckless driving. The power to a police constable to apprehend without warrant is limited to the case of a person who has already driven recklessly, and who in addition has

(*a*) Refused to give his name and address or to produce his licence, or

(*b*) Is driving a car without an identification mark.

Sec. 13, requiring a male servant's licence for a "person employed to drive a motor car," is reasonable, if reasonably construed, that is to say, where the engineer corresponds to a coachman. Where, however, he is an engineer, and only drives the car incidentally to or from the stable, it would be unjust to impose the tax, and I hope that any attempt to do so will be resisted by automobilists in general, and by the Motor Union.

Registration.—To effect registration the owner must apply, and pay a fee of 20*s*. The Council cannot refuse a registration, but must assign a number forthwith. Any owner can apply to any Council for his registration, not necessarily the one in whose area he resides. Notice of change of ownership costs 5*s*. To change a car to which the same number applies is perhaps possible under Article 5, without charge, and can certainly be done under Article 6, but would probably require another sovereign.

Identifying Marks.—The provision in the draft order that no other letter shall be placed or shall appear within 24 inches of the plate has disappeared. Only the back number is required to be illuminated. The mark may be painted upon the car instead of using plates. Similar plates must be fixed upon any other vehicle drawn by the car, but at one end only.

The onus is thrown on the driver of seeing that his number remains easily distinguishable by day and properly illuminated at night.

Driving Licences.—The third section of the new Act provides for the granting of licences, and the fourth section for their endorsement. It is an offence under the Act either to (*a*) "drive a motor car on a public highway" without a licence, or (*b*) to "employ any person who is not so licensed to drive a motor car." A person can only be licensed in the county or county borough where he resides; the fee is 5*s*. a year, and the grant of the licence to persons of either sex is compulsory without examination, unless the applicant is disqualified. There are three disqualifications:—

(*a*) Being under seventeen years.

(*b*) Holding a licence already for another county.

(*c*) Disqualification by order of the Court, under Sec. 4.

The Court before whom any person is convicted shall cause particulars of the conviction, and of any suspension or disqualification, to be endorsed upon the licence, and shall send a copy to the Council granting the licence. This compulsory endorsement applies to every offence in connection with the driving of a motor car, except a first or second conviction for exceeding the speed limit. As these are not to be endorsed, it is not quite clear how a driver will ever reach a second conviction except at the same Court. The particulars of the endorsement are supposed to be carried on from year to year, though I can find no provision for this except a casual note on the form of licence shown in the regulations. The driver of a car must always produce his licence when required by a police constable.

Speed Limits.—The new Act provides a maximum speed limit of 20 miles per hour, with power to the Local Government Board (subject to the observations made hereafter) to fix a speed limit of 10 miles per hour, on the application of the local authority, with a view to the safety of the public in certain places. Prosecutions for exceeding the speed limit simply are subject to the following safeguards:—

(*a*) Warning shall be given at the time, or notice sent within such time as the Court think reasonable, in no case exceeding 21 days.

(*b*) The first and second offences shall not involve endorsement of the licence.

(*c*) There shall not be a conviction for exceeding 20 miles per hour "merely on the opinion of one witness as to the rate of speed." This last safeguard does not apply to exceeding the 10-mile limit.

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* Extract from a Paper read at the Automobile Club on January 21st.

The Local Government Board may make regulations to prohibit or restrict the use of motor cars or any special kind of motor cars on any part of a highway which either

(*a*) does not exceed 16 ft. in width, or
(*b*) is in the opinion of the Local Government Board especially dangerous.

Local authorities are to place notices in conspicuous places on or near the highway where the speed is limited to 10 miles per hour, or where the use of motor cars is prohibited. The duty is also imposed on them of setting up caution boards where necessary, to denote dangerous corners, cross roads, and precipitous places.

Taxes and Fees.—A motor car is now liable to the annual carriage duty of £2 2*s*., with an additional £2 2*s*. if over one ton, and £3 3*s*. if over two tons. The new Act imposes the following additional payments:—

	£	*s*.	*d*.
(1) Registration	1	0	0
(Motor cycles, 5*s*.)			
(2) Change of ownership	0	10	0
(3) Duplicate, if licence lost or defaced ...	0	1	0
(4) Driving licence, annual	0	5	0
(5) Male servant's licence, annual	0	15	0

Offences and Penalties.—The following sixteen new offences and new penalties are created by the new Act, in addition to which the £10 fine remains in force for infractions of other regulations of the Local Government Board under Sec. 6, or of the Home Secretary under Sec. 5, of the principal Act (Locomotives on Highways Act, 1896):—

***Penalties.**—

1st offence £20, A B C; 2nd offence £50 or 3 months, A B C., for

(1) Driving a motor car on a public highway (*a*) recklessly, (*b*) negligently, (*c*) at a speed or in a manner dangerous to the public, having regard to all the circumstances of the case, including the nature, condition, and use of the highway, and to the amount of traffic which actually is at the time, or which might reasonably be expected to be on the highway.
(2) Driver who has committed one of the three previous offences refusing to give, or giving false, name and address.
(3) Owner failing to give any information in his power which may lead to identification and apprehension of above driver.
(4) Using a car on a public highway—
 (*a*) Without being registered.
 (*b*) Without fixing identification mark.
 (*c*) Obscuring the mark in any way, or rendering it not easily distinguishable.
 (*d*) Allowing the mark to become not easily distinguishable.
(5) Driving a motor car on a public highway without a licence.
(6) Employing an unlicensed person to drive a motor car.
(7) Failing to produce licence for endorsement within a reasonable time.
(8) Applying for or obtaining a licence—
 (*a*) While disqualified.
 (*b*) Without giving particulars of endorsements.
(9) Forging, or fraudulently altering, or using, or lending any mark or any licence under the Act.

1st offence, £10, A B C; 2nd offence, £20, A B C; 3rd offence, £20, A B C., for

(10) Failing to stop, and, if required, give name and address, after knowing of the occurrence of an accident owing to the presence of the motor car on the road.

1st offence, £10; 2nd offence, £20; 3rd offence, £50, A B C., for

(11) Exceeding the speed limits of 20 and 10 miles per hour respectively.

1st offence, £10, A B C; 2nd offence, £20, A B C; 3rd offence, £50, A B C., for

(12) Driving over Menai Bridge other than in accordance with regulations made by the Commissioner of Works.

Apprehension without warrant by any police constable who sees the reckless driving, for

(13) Committing the offence of reckless driving (No. 1), and then (*a*) refusing to give name and address or produce licence, (*b*) not having mark on car.

£5, A B C., for

(14) Driver failing to produce licence when demanded by police constable.

£10, A B C., for

(15) Driving motor car on specified highway where forbidden by the Local Government Board.

£10, A B C., for

(16) Disobeying any of the existing regulations of the Local Government Board lawfully made under Seetion 6 of the principal Act as to (*a*) car being in charge of competent person, (*b*) lamps, (*c*) travelling backwards, (*d*) keeping rule of the road, (*e*) sounding horn, (*f*) stopping for police or restive horse.

(*To be concluded.*)

THE descriptive article on the Pedrail, which we conclude this week, will give our readers a good general idea of this very ingenious and extremely interesting system, but it is naturally impossible for us in the comparatively small space at our disposal to deal with the subject at any greater length than we have done, although there are many other aspects which are well worth the attention of those studying the problem of road traction. We might, however, again call their attention to Mr. Diplock's book, "A New System of Heavy Goods Transport on Common Roads," which enters into the question very thoroughly, besides containing much information of general interest to the users of the roads.

A SOMEWHAT unpleasant fact has come to the surface in connection with the New York Madison Square Automobile Exhibition, as it has been found that some early applicants for large spaces who have obtained their allotments have done so merely for speculative purposes, and have thereby no doubt secured premiums from many exhibitors who would have been legitimately entitled to have had their applications for space granted by the management. There should be no difficulty, now such a system has been discovered, in ensuring that *bonâ fide* exhibitors for the future will receive preference in the allotment of show space, as the passing of a rule rendering it impossible for any space to be transferred, except by re-allotment by the Committee, and at the discretion of the Committee the forfeiture of any deposit paid, would at once place the entire power in the hands of the management.

GRATITUDE.

Chauffeur: What do you want?
Tramp: I jest want to t'ank youse gents for keepin' de village constables so busy dat dey ain't got no time to bodder wid us hoboes.—*The Motor, U.S.A.*

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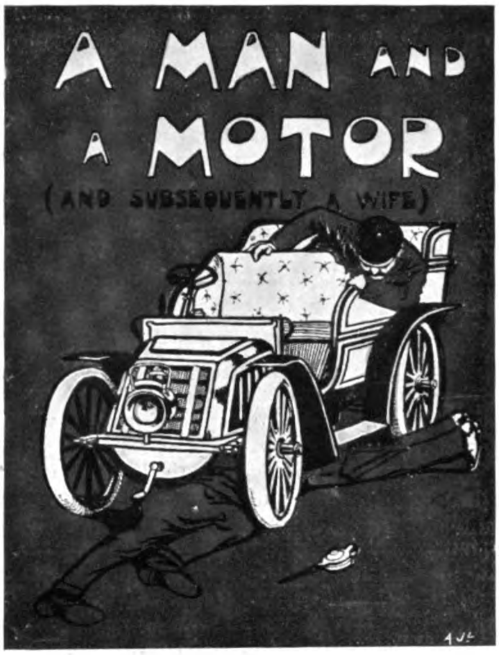
* The letters A B C refer to the additional power to deal with his licence given to the Court which convicts an automobilist, and have the following meanings:—*A. Endorsement of licence: B. Suspension of licence for remainder of current year, or any less period: C. Disqualification for obtaining another licence for any period the Courts think fit.*

REVIEWS OF BOOKS.



"A Man and a Motor," by R. W. Bradshaw-Needham. (London: Clements Publishing Company, Portugal Street, 1*s.*)

THIS is really an exceedingly funny, and, what is more, at times a thoroughly witty book. It might be correctly described as being to automobilism much what Jerome's "Three Men in a Boat" was to boating. Of course a good deal of the funniness is at the expense of the motor, and from that point of view was truer to life and fact a few years ago than now, but the greater part of it is at the expense of the driver, and the driver, who ultimately obtains a wife far in excess of his deserts, is a terrible fellow. We would not like to apply an epithet to him, but he is certainly one of those whose proceedings must have been largely responsible for the public hostility to which we attribute the stringent provisions of the 1903 Act.

The frontispiece of this book, which we reproduce, is thoroughly indicative of its contents. It is one broad laugh from start to finish, and considering how broad the humour is, and how vigorous is the fun, it is really quite surprising that there are so few lapses into vulgarity. The tall stories are excellent, particularly the one of how the car ran down a hill on one wheel only, being followed by the other three which had come off, and were subsequently replaced on the axles when the next incline upwards was reached, the journey being continued with five minutes interruption as if nothing had happened. At the speed described we are astonished that it was thought necessary to retain one wheel on the car, for the air pressure on the horizontal surfaces should have been quite sufficient to raise the vehicle like an aeroplane. The illustrations throughout are as amusing as the letterpress, and the picture of the policeman stopping the car will probably be extracted and framed by many a motorist. Curiously enough the policeman appears on page 98, a coincidence which may give a new significance to that old ballad, "Who fears to speak of '98"?

CLUB DOINGS.

Herefordshire Automobile Club.—The annual general meeting, presided over by Mr. J. T. Hereford, the President of the club, took place last week at the Mitre Hotel, Hereford. The Hon. Secretary, Mr. Wilfred Groom, in his report mentioned that the membership now totalled 58, 28 of whom owned motor cars, and 30 motor cycles. A substantial cash balance was in hand, in addition to a good stock of club badges. He reported that the County Council had decided not to apply for the closing of any roads to motorists or impose the 10-mile speed limit. After referring to the affiliation schemes with the London club, he stated that arrangements were in course of being made for the ensuing season to meet various other clubs on some of the club runs.

Lincolnshire Automobile Club.—At a recent meeting of the committee, Captain J. A. Cole, J.P., in the Chair, and the President, Sir Hickman Bacon, Bart., being amongst those present, letters were read from Lord Willoughby de Eresby, M.P., and Mr. William Garfit, M.P., consenting to continue to act as Vice-Presidents of the club for the ensuing year. It was decided to hold an informal dinner at Boston on January 30th, open to members and their friends, to be followed by a paper, to be read by Dr. Gilpin, of Bourne, on "The cost, care, and upkeep of a motor car." The club's annual dinner was fixed to take place at headquarters on April 15th, and a sub-committee (with Mr. Godfrey Lowe, of Lincoln, as hon. sec.) was appointed to make the necessary arrangements. The following new members were elected:—Mr. E. A. Arnott, of Maida Vale, London, and Mr. A. Curtis, of Gainsborough. It has been decided to issue to members who desire it, notes of committee meetings, on payment of a small sum (one shilling) to cover postage.

Manchester Automobile Club.—At the annual meeting of this club, Mr. Fred Smith occupied the Chair when the report of the committee for 1903 was read by Mr. Hoyle Smith. The membership of the club, it was notified, was now 166, and the report dealt very fully with the proceedings of the committee and the various runs which had been made during the period under review. The Chairman, in moving the adoption of the report, pointed out that although the work done during the past year had not been of a very sensational character, the committee had been engaged in doing solid practical work according to its lights, which he thought the members would admit to be of much more importance to their pleasure as motorists than arranging for club runs. He dealt fully with the negotiations and the question of affiliation with the London club. This led to considerable discussion and criticism from Mr. Henriques, Mr. L. Schwabe, Mr. Herbert Lee, &c. The report of Mr. S. Okell, the Treasurer, showed a considerable balance in hand.

A discussion followed the adoption of the report in regard to increasing the subscription from one to two guineas, and a vote was subsequently taken amongst those present in favour of increasing the subscription, subject to the confirmation of an extraordinary general meeting to be called for that purpose.

Mr. Okell and Mr. Hoyle Smith were re-elected Hon. Treasurer and Hon. Secretary respectively, a high compliment being paid to Mr. Hoyle Smith for his work in promoting the comfort and enjoyment of all members of the club.

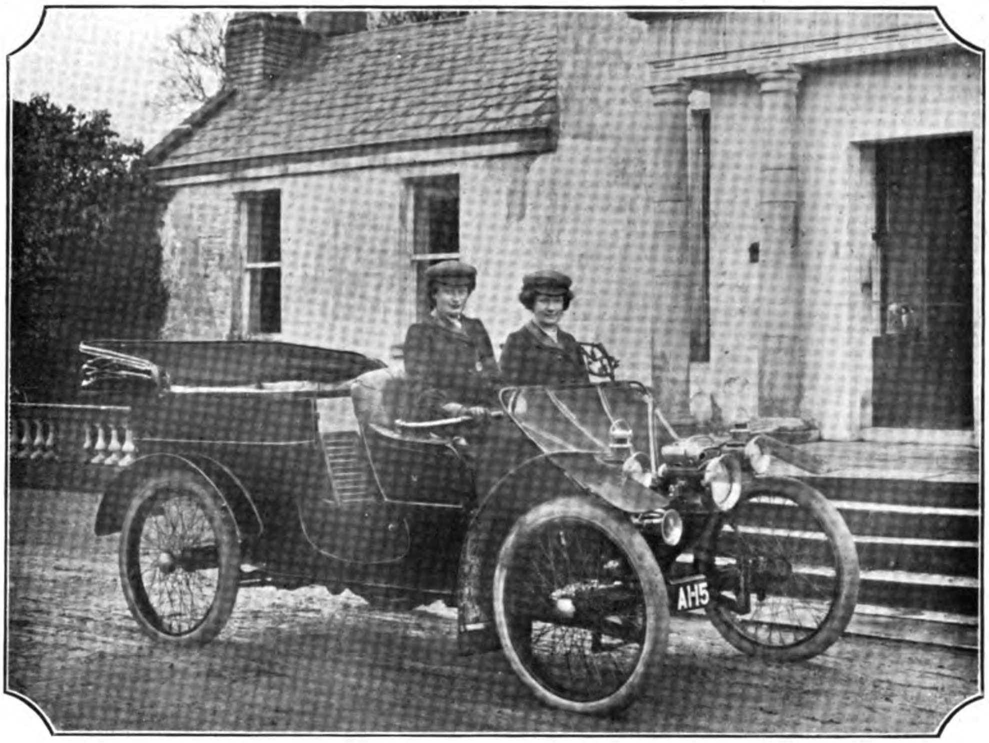
Midland Automobile Club.—Amongst the meetings for the winter season already arranged to be held at the Club Room in the Birmingham Grand Hotel, are "Road Reminiscences and Cinematograph Pictures" to-night, January 30th; the annual dinner on February 6th; a paper by Mr. F. W. Lanchester, entitled "Wire Wheels Tyred," on February 27th, followed by a smoking concert; and on March 12th the general meeting, winding up with a dinner and discussion on next season's events.

Scottish Automobile Club (Eastern Section).—The Rt. Hon. Sir J. H. A. Macdonald, K.C.B., President of the club, in the absence of the Lord Provost, presided in Edinburgh on the 21st inst. at the annual dinner of this club. About 100 guests were present, the Chairman being supported by the Rt. Hon. A. Graham Murray (the new Secretary for Scotland), Col. Borthwick, Major Portall, Mr. Norman D. Macdonald, Mr. Adam (Chairman of the Western Section), Col. Duff (Black Watch), Dr. Dawson Turner, Sheriff Lees, Chief Constable Ross, Mr. John Wilson, Mr. J. R. Smith, &c.

The Chairman proposed the toast of the evening, the health of Mr. Graham Murray, and remarked that Mr. Murray was invited, not so much because he was an automobilist, as to give a hearty welcome to the gentleman who now occupied the position of Secretary for Scotland. He felt sure that the new Secretary being an automobilist was a good thing in the interests both of the public and of those who used motor cars, as he would be able to deal, as they knew that he would deal, with perfect impartiality in regard to what was undoubtedly to be one of the great industries of the future, with what was undoubtedly to be one of the great advances, not only of sport but of what was to benefit the country in the matter of road transport.

The Secretary for Scotland, in acknowledging the toast, said that if he had been invited to the banquet in the month of October he might perhaps have thought it was gratitude from automobilists for favours to come, but as the first set of regulations had already been issued he was quite satisfied to think that it had nothing to do with a sort of attempt to get at the Secretary for Scotland. He stated that he believed he had been as great a road user as anybody present, having been a bicyclist for a great many years. He acquired a motor bicycle at its very inception, and since then he had become the possessor of a car. He thought the possession of a motor bicycle was a fine experience. It gave them experience for the car. He managed during the summer to run a light car for 3,000 miles without a chauffeur or a breakdown, and he did not think he could have done that if he had not previously had a motor bicycle. In regard to the passing of the new Motor Bill through the House of Commons, he believed he did a good deal of good in connection with it, as in the first place he never spoke, and that was useful, because the people that did not know anything about it did speak. He acted, however, as a sort of intermediary between the automobilists and the anti-automobilists. The discussion on the Bill, he said, revealed an amount of absolute prejudice against this new form of locomotion which was perfectly shocking to anybody that knew anything about it. On the other hand, if human testimony was to be believed at all, it revealed a series of outrages on the part of those who used automobiles which certainly was rather heartrending to anybody who had the sport at heart. He was quite aware, from the point of view of a motorist, that the speed limit was considered absolutely low. He was also quite aware, from the point of view of a member of the House of Commons, that if the speed limit of 20 miles had not been accepted the Bill would have been wrecked, and, if the state of prejudice and feeling which existed then had gone on, motoring would have practically been stopped altogether. Therefore, he had no hesitation in saying that it was a wise position of his colleague, Mr. Long, to accept the 20 miles limit as it stood. He really thought that as automobilists they might take the motto of Mr. Micawber—expenditure, £19 19*s.* 1*d.*; income, £20—result, happiness; expenditure, £20 and a penny—the result, misery. So if they applied that to the speed limit they would find that, with a pace of 19 miles 1,759 yards per hour, the result would be happiness, whereas if they went over that it would end in misery.

The Chairman, in proposing the toast of "Automobilism," said that it was said the passing of the Bill would mean the crushing of the industry of automobiles. This he never had believed, and he had said so. What he did think was that it would have been fatal to automobilism in this country if the Bill had not been passed last year, for whatever might have been its defects, whatever might be its restrictions—he hoped temporary restrictions—it had had the effect of satisfying the public mind that something had been done for them, and thereby to quiet down the ebullition in which the public were in regard to motor cars.



The two first ladies in Ireland to obtain licences to drive automobiles under the new Act are the Misses Rowley, of Sylvan Park, Kells. These ladies are enthusiastic automobilists, and have attained considerable skill in driving their 10-h.p. Lanchester on which they are here seen seated. The Miss Rowley who is driving the car took the greatest interest in the Gordon-Bennett Race, and will be remembered by many as having been very much in evidence on the course on that occasion.

After giving some amusing road experiences, the Chairman remarked that he wished them to recognize that this was not merely a question of personal enjoyment; it was not merely a question of rich people or of people of moderate means having a car in which to enjoy themselves. He wanted them to realize that it was a movement which was going to have an extraordinary effect on all branches of national life, of military life, social life, and mercantile life, and above all, of agricultural life. There could be no doubt that the revival of the road as a means of transit in opposition to the railway would be of enormous commercial advantage to the country.

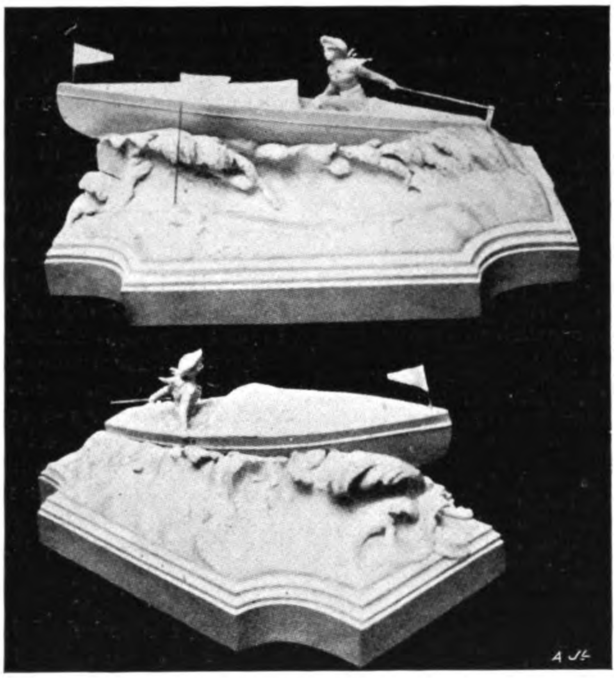
Dr. Dawson Turner replied, and the other toasts were:—"Other Automobile Clubs," by Mr. Norman D. Macdonald, Chairman of the Scottish Automobile Club, and replied to by the Comte L. de Clercq, member of the Technical Committee of the A.C. of France; and "The Chairman," proposed by Councillor W. W. Macfarlane. Some excellent musical selections helped to enliven a very enjoyable evening.

Sheffield Automobile Club.—The annual report for 1903 of this club, which was founded in 1902, has now been submitted. It details the various runs, trials, and hill-climbing competitions held, and records the important work which has been carried through by the club in the general interests of automobilism. The committee have, in fact, found it necessary, to cope with the business of the club, to meet at least once a fortnight throughout the year, and often once a week, a fact which will no doubt be fully appreciated by the members of the club. In concluding the report, the committee place on record their appreciation of the valuable services and help rendered to the club from the editors of each of the automobile journals and the local press.

Motor Cycling Club.—From the report issued of this club, and presented to the members on Thursday of this week, it appears that the membership on November 30th, 1903, was 109, as against 30 at the same period in 1902. In like manner the surplus of assets over liabilities have advanced very considerably, and the club altogether appears to be in a very satisfactory state.

It is in contemplation by the club to hold a twenty-four hours' run from London to Edinburgh during the present year.

THE absurdity of the 10 mile limit in towns, particularly the Metropolis, has been well demonstrated by some experiments privately carried out last week in the West End with a Napier car fitted with a speedometer The object was to test the speed of ordinary horse-drawn traffic, and the Napier car accordingly in turn accommodated its pace to that of omnibuses, cabs, and electromobiles. The results were distinctly surprising. Even omnibuses when not interfered with by other traffic were found to proceed normally at 8 to 9 miles an hour, quickening at times to 11; cabs and carriages at 9 or 10, sometimes exceeding the latter pace by a mile an hour; while electromobiles seldom proceeded slower than 10 miles an hour, and even reached 12 and 14. Enforcing a 10 mile limit, therefore, would mean that automobiles in towns would be compelled to go slower than the ordinary traffic of the roadway, and would, under no circumstances (even for getting out of a squeeze), be legally permitted to go faster. In the interests of the ordinary traffic of the road we submit that this is absurd, and is no doubt one of the reasons, amongst many, which has weighed with practically the whole of the County Councils throughout the country in inducing them to refrain from asking for the imposition of the 10 miles limit.



M. Paul Meyan, of "La France Automobile," has offered a challenge "cup" for competition for motor boats during the coming season. We reproduce from our contemporary two views of the trophy from which an idea of the vigorous action and verve with which the artist has successfully imbued his work can be obtained. It will be raced for at Nice on April 17th.

IN consequence of the Preston Corporation seeking to impose a 10 miles limit within its borough boundaries under the new Act, a number of automobilists of the district have determined, in condemning their action, to band themselves together by founding an automobile club for the district.

RACES, RECORDS, AND TRIALS.

GORDON BENNETT ITEMS.

IT is now practically certain that the chief portion of the Eliminating Trials, for determining the representatives for Great Britain, will take place over the Circuit des Ardennes, and to that end Mr. Julian Orde, the club Secretary, is now engaged in final negotiations.

In France hopes are great that the Argonne Circuit will be authorised by the French Government, in which case some slight variations from the route already suggested will in all probability be made. These will help to make the course nearer in character to the Taunus course, and, therefore, enable drivers to more effectually demonstrate what they can do under the conditions likely to prevail in the actual race.

In spite of Ch. R. de Knyff's name having been given as one of the Panhard team, his driving is more than doubtful, and Maurice Farman after all may join his brother and Teste in the trials.

The excessive greed of the German hotel-keepers in the immediate neighbourhood of the Taunus course is already beginning to bear fruit, as the French "caravan" of tourists being arranged by *L'Auto* to attend the race, is, it is announced, being reconsidered with a view to so altering the programme as to defeat the unreasonable demands which are already looming large in the distance.

For the three Opel-Darracq cars, built at Russelsheim, which are to take part in the preliminary trials for Germany, the drivers named are Fritz Opel, Heinrich Opel, and Willy Poege. Madame du Gast is mentioned as likely to drive one of the 80-h.p. Benz-Parsifal cars, but as the final decision as to the selection of drivers rests with the German Automobile Club, we doubt very much if official consent will be given for a lady to take part.

The A.C. of Austria announce that they will organise an excursion to attend the race, starting from Vienna on June 11, and arriving at Homburg on June 15, the route being *viâ* Salzburg, Munich, and Heidelberg.

VENTOUX Hill Climb is definitely announced to take place on August 28th next.

BY cable from America, W. K. Vanderbilt, jun., driving a 90-h.p. Mercedes car, is announced to have, on Wednesday, covered a mile in 39 secs. (= 92·30 m.p.h.) on the Ormond-Daytona Beach.

A FORTNIGHT ago we published the remarkable feat of Henry Ford on his 70-h.p. racer in covering the mile in 39⅖ secs., equal to 91·37 miles per hour, on an ice-covered lake in America. Following this cabled information some interesting particulars are now to hand of the track on which this marvellous record was made. Baltimore Bay was selected as the scene of the attempt, and a considerable gathering of onlookers witnessed the performance. A five-mile stretch was selected, and swept clear of snow. Hot cinders were then laid on the ice, which melted into it, and then froze. On these another layer of fine cinders was sprinkled, and finally over this a layer of warm sand. Subsequently the entire track was swept, brushing away everything loose. A measured mile was laid off between the second and fourth miles, the first mile allowing for getting up speed and the last for stopping. The timekeepers were approved by the American Automobile Association, and no doubt Ford's time will, therefore, in good time, be officially booked as the world's record.

IN connection with the Vienna Alcohol Exhibition, as already announced, an alcohol fuel consumption trial is being organised by the Austrian Automobile Club. This will take the form of two competitions, one being for tourist cars and the other for heavy vehicles. The tourists' run will be over 100 kilometres, a maximum time being fixed for covering this distance. Heavy vehicles will be divided into several categories, viz., 1. Omnibuses carrying at least 6 passengers. 2. Delivery vans. 3. Light wagons carrying 600 to 2,000 kilogs. 4. Heavy wagons carrying over 2,000 kilogs. 5. Tractors hauling one or more vehicles. Vehicles in categories 1 and 2 will have to cover a distance of 75 kilometres; categories 3, 4, and 5, 50 kilometres. The maximum time allowed will be 12 hours. A competition for electrical vehicles will also be included in the programme. These will have to cover 30 kilometres.

LAST week the particulars affecting the tourist vehicles were published by us in connection with *L'Auto's* consumption Criterium taking place on March 3rd, 4th and 5th next. The regulations governing the heavy vehicles in this competition are now available. There will be two categories, viz., 1, vehicles carrying less than 1 ton useful load; 2, vehicles carrying more than 1 ton.

The formula under which the consumption will be ascertained and penalised is the same as that published by us last week for the tourist vehicles. In regard to the regularity of working and average speed the daily distance will be 60 kiloms., which must be covered under four hours at an average speed of 15 kiloms. per hour. For the Picardie Hill Test all vehicles must maintain an average speed of 12 kiloms. per hour.

UNDER the auspices of the Deutscher Radfahrer Bund, a motor bicycle road competition is to be run off on June 6th between Frankfort-am-Main, Cassel, Hanover, Magdeburg, and Potsdam.

AT Barcelona, on the 17th instant, a motor bicycle race was successfully carried through after several postponements in consequence of bad weather. Fifteen competitors started over the course of 140 kilometres between Pedralves and Igualada. The results were as follows: 1, Abada (3½-h.p. Werner), 3 hrs. 21 mins.; 2, Escoda (2-h.p. Peugeot), 4 hrs. 2½ mins.; 3, Mendelssohn (2-h.p. Decauville), 4 hrs. 28 mins. 25 secs.; 4, Chassaigne (1¾-h.p. Clement), 5 hrs. 5 mins. 25 secs. A maximum time of 7 hours was allowed, the above four being the only machines completing within the specified time.

ITALY is joining in the general craze for airship construction, and an airship of the navigable balloon type has just been finished by Capt. Frassinetti, of Milan, of which we are able to furnish the following data: the length of the gas vessel is 37 metres, its maximum diameter 8½ metres, its capacity is 1,300 cubic metres, and its lifting power when inflated with hydrogen 1,500 kilogs. The hull of the vessel, which is built of steel tubing, is provided with two petrol motors of 24 h.p., which are said to be exceptionally light. In addition to the driving propeller, further propellers are provided for raising and lowering the vessel and for steering it. The Frassinetti airship is attracting considerable attention in the town of its origin.

MR. CODY continues to carry on his interesting kite-flying experiments, and on Thursday in last week he broke his previous record of 1,200 feet by ascending to just under 1,600 feet above the surface of the earth. Mr. Cody took up a telephone transmitter and receiver with him, and paid out a telephone wire as he ascended. In this way, when seated at his highest altitude, he was able to keep up a telephonic conversation with his assistants on the ground. The value of the experiments for purposes of military reconnaissance are obvious, so that we are rather surprised that the naval officers who witnessed Mr. Cody's flight were not supported by some representatives of the other branch of the Service.

The automobile has long ceased to be a mere fair weather vehicle, and its capacity for negotiating even a considerable depth of snow is far in excess of that of any horse-drawn vehicle, a fact which we think is well illustrated by our two picturesque photographs of White Cars in the neighbourhood of Cleveland, Ohio. The effect of complete isolation on the snowy landscape has something of the romantic about it, and shows the well-designed lines of the White Vehicles to advantage.

LORD IVEAGH has announced that he hopes that the scheme for the development of Irish industries and agriculture by means of canals and motor car services, as arranged by Mr. Pirrie and himself, will very shortly be started.

SENATOR HILL, in the name of the Automobile Association of the State of New York, is introducing a Bill into the Senate modifying the existing Bailey Automobile Enactment. The new Bill mainly deals with the present speed limits and the authorities controlling same.

THE New York Madison Square Automobile Show closed on Saturday last, when a big club banquet took place as a wind-up. Amongst the guests present were T. A. Edison, Santos Dumont, Hotchkiss, General Miles, and Col. Pope. The Show is reported as having been the best and most successful so far held in America.

IT has been decided by the Tunbridge Wells Education Committee to start a class in motor car construction and driving at the Technical Institute. By way of encouraging this excellent idea, the Mayor, Alderman E. Elvy Robb, has announced his intention of becoming a pupil, and a number of local professional gentlemen have also notified their intention of joining.

A GENERAL scare appears to have taken hold of the licensing authorities throughout the United States following upon the fearful Iroquois Theatre disaster. One of the houses pounced down upon in consequence was the Chicago Coliseum, at which the Chicago Automobile Show is to be held on February 6–13, and a summary order was issued for its instant closing as being unsafe. This order, however, was subsequently cancelled in consequence of it being found that the officials' fears were groundless, and once more there is rejoicing in the city that the Show was not thereby brought to a sudden and untimely end.

CORDINGLEY'S Automobile Exhibition, to which, it is announced, the Automobile Club have given their patronage, will, as our readers are no doubt well aware, be held from March 19th to the 26th of the present year, and we understand that it promises to be the largest of the series yet held at the Agricultural Hall, over 250 exhibitors having already booked spaces. Heavy motor vehicles will occupy the whole of the minor hall, including motor 'buses, public service vehicles, agricultural motors, and lurries for the transport of goods and produce, whilst in the Aeronautical Section, under the auspices of the Aero Club, military balloons actually in use at Ladysmith, as well as airships, will form part of many interesting exhibits on view. Berners Hall, King Edward's Hall, the annexes, and the galleries will all be devoted to the purposes of the Exhibition.

THIS week the following firms were elected members of the Society of Motor Manufacturers and Traders, viz.:—The Bat Manufacturing Company, Limited; Minerva Motors, Limited; the Cadogan Garage and Motor Company, Limited; the Rex Motor Manufacturing Company, Limited.

Messrs. Kelly, Boumphry and Co., 73, Market Street, Birkenhead, have been appointed sole agents for Birkenhead and the district on behalf of Messrs. De Dion Bouton, Limited.

DOINGS OF PUBLIC COMPANIES.

Newton Pearce Motor Car Company (Limited).—At an extraordinary general meeting of the above company, convened and held at 55, Market Street, Manchester, on January 4th, 1904, it was resolved that it having been proved to the satisfaction of the Newton Pearce Motor Car Company, Limited, that the company cannot, by reason of its liabilities, continue its business, it is advisable to wind up the same, and that accordingly it be wound up unconditionally, under the provisions in that behalf of the Companies Acts. Mr. P. F. Huddleston, of 72, Finsbury Pavement, London, E.C., was appointed liquidator for the purpose of such winding up.

British Electric Car Company (Limited). — In the Chancery Division on Wednesday, Mr. Justice Kekewich had before him the action of Sinclair v. the British Electric Car Company (Limited), which came on as a motion for judgment. The plaintiff is a debenture stockholder in the company, and he asked for the enforcement of his security. Mr. Justice Joyce had appointed a receiver and manager of the company, and it was stated that the company had a number of contracts which must be carried out. Mr. Justice Kekewich gave judgment for the plaintiff, directing the usual accounts and inquiries to be taken, continued the manager until the 31st July next, and gave general liberty to apply.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

L'Agence Générale des Automobiles Francaises (Limited).—Capital, £15,000 in £1 shares (10,000 preference). Object, to carry on the business of wagon, carriage, motor car, &c., builders, and to construct on the Thames, or elsewhere, a dock with patent and other slips, workshops, buildings, machinery, warehouses, and other conveniences.

L. A. Beckett (Limited), 31, and 32, King William Street, E.C.—Capital, £1,000 in £1 shares. Object, to acquire the business of a motor dealer, carried on by L. A. Beckett, at 47, Pall Mall, S.W. First directors, L. A. de Becker and H. A. Mabey.

Lake District Road Traffic Company (Limited), Church Street, Ambleside, Westmoreland.—Capital, £25,000 in £1 shares (24,500 preferred ordinary and 500 deferred ordinary). Object, to carry on the business of carriers of passengers and goods, dealers in and letters to hire of motor cars and wagons, &c. First directors, W. P. J. Fawcus, R. Rigg, F. Fowkes, R. Bounass, T. Taylor, J. S. Harker, A. Jackson, and J. Cowperthwaite.

Dublin and Swords Motor Car Company (Limited), Mantua, Swords, co. Dublin.—Capital, £2,500 in 500 shares of £5 each, for the purpose of establishing a line of motor cars between Dublin and Swords, both for passenger and goods traffic. Directors or managers, Rev. David P. Mulcahy, P.P., Messrs. Joseph Christie, J.P., Thomas Aungier, J.P., Elias Corpally, J.P., J. P. Cuffe, C. L. O'Callaghan, and M. McDonagh, J.P.

Manufacturers' Centre (Limited), Commercial Buildings, 19, Steelhouse Lane, Birmingham.—Capital, £2,000 in £1 shares. Object, to carry on the business of cycle and motor agents, factors, and dealers, &c.

Peto and Radford.—Capital, £40,000 in £1 shares. Object, to adopt two agreements (1) with Peto and Radford (Limited), and (2) with the P. and R. Storage Battery Company (Limited), and to carry on the business of manufacturers of and dealers in electric meters and any other electrical instruments.

Select Cycle and Motor Manufacturing Company (Limited).—Capital, £6,000 in £1 shares. Objects, to acquire the business of the Select Cycle Company, of 1, Iverkip Road and Prince's Pier, Greenock, of cycle builders, hirers, and repairers, mechanical engineers, &c.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published February 4th, 1904.

27,361. T. W. BARBER. Burners for liquid fuel.

Applied for in 1903.

Published January 28th, 1904.

344. A. G. MELHUISH. Internal combustion engines.
374. P. L. RENOUF. Internal combustion engines, transmission and steering gear.
435. M. H. SMITH. Steering mechanism.
472. A. W. WALL. Friction clutches for motor cycles.
560. P. L. RENOUF AND E. B. TILLAM. Internal combustion engines
788. P. BRUNEAU AND CIE. Gear wheels.
881. W. CROSS. Liquid fuel bnrners.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

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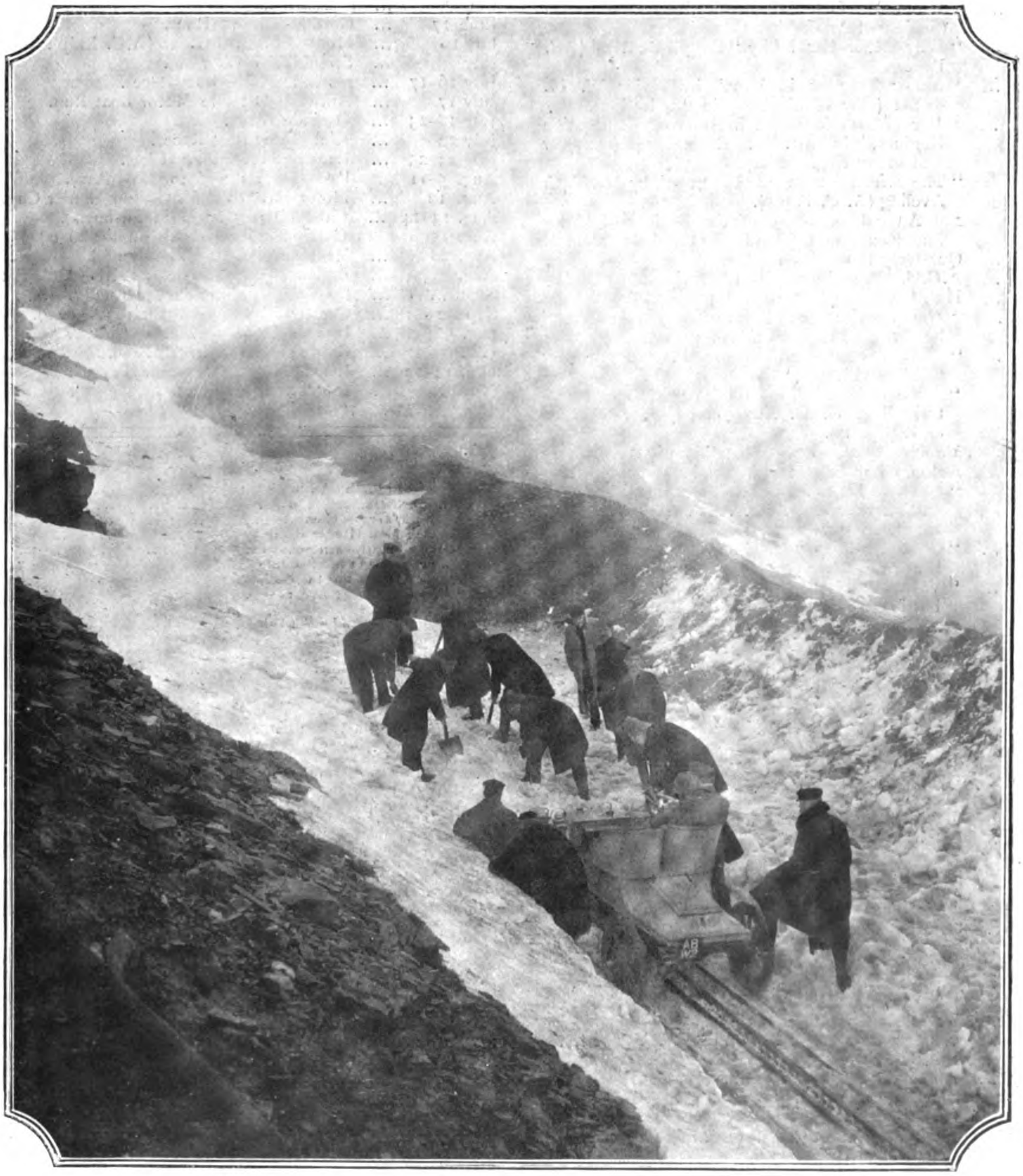

CLIMBING SNOWDON BY AUTOMOBILE.—WHY THE ATTEMPT HAD TO BE ABANDONED. (See page 133).

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.

Feb. 1	Final Entry Day for British International Cup.
Feb. 1	"Evolution of Road-making in Scotland," by Mr. R. Drummond, C.E. (Scottish A.C.).
Feb. 2–6	Liverpool Cycle and Motor Show (St. George's Hall).
Feb. 3	"Steam Cars for Public Service," by T. Clarkson (Society of Arts).
*Feb. 4	"Why Motor Cars?" by "Cargill Gentry" (AC. Paper).
Feb. 10	"Motor Traction in War," by Major W. H. Balfour (Royal United Service Institution).
Feb. 11	"Recent Developments in Internal Combustion Engines," by Mr. L. Rottenburg (Glasgow University Engineering Society).
*Feb. 11	"The British Automobile Industry," by Mr. T. C. Aveling (A. C. Paper).
Feb. 12–24	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
*Feb. 12	Quarterly 100 Miles Trial.
Feb. 15	A.C.G.B.I. and Provincial Clubs' Conference.
Feb. 23–27	Hull Cycle and Motor Show (Assembly Rooms).
*Feb. 25	"The Manufacture and Use of Pneumatic Tyres," by Mr. J. C. Siddeley (A.C. Paper).
Feb. 27	"Wire Wheels Tyred," by Mr. F. W. Lanchester (Mid. A.C.).
Mar. 4	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12	Manchester Motor Show (St. James's Hall).
Mar. 9	Automobile Club General Meeting.
Mar. 15	"Motor Vehicles for Goods Transport," by Mr. J. E. Thornycroft, A.M.I.C.E. (Glasgow Un. Engineering Society).
Mar. 15	"Cost, Up-keep, and Care of an Autocar," by Messrs. J. Adam and J. H. Steen (Scottish A.C.).
*Mar. 17	"Valves and Valve Mechanism of Internal Combustion Engines," by Mr. R. E. Phillips, M.I.M.E. (A.C. Paper).
Mar. 19–26	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24	Smoking Concert.
Mar. 25–30	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May	British Gordon-Bennett Race Eliminating Trials.
May 19–20	Glasgow-London Non-Stop Run.
June 1–7	Motor Bicycle Endurance Trial.
August	British International Cup for Motor Boats.
Sept. ...	*Reliability Trials.
Oct.–Nov.	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.

Jan. 23–Feb. 4	Brussels Automobile Salon.
Feb. 3–6	Paris-Turin Tourist Run (*France Automobile*).
Feb. 6–13	Chicago Show.
Feb. 6–21	Turin Exhibition.
Feb. 14	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Feb. 15–20	Detroit Show.
Feb. 23–27	Anti-Skid Trials at Versailles.
Feb. 29–Mar. 5	Cleveland Show.
Mar. ...	Paris-Rome (*La France Automobile*).
Mar. 3, 4, 5	Fuel Consumption Trials (*L'Auto*).
Mar. 6–12	Buffalo Show.
Mar. 13–20	Cannes Automobile Week.
Mar. 14–19	Boston Show.
Mar. 15–16	A.C. America Commercial Vehicle Trials.
Mar. 19–27	Frankfort Exhibition.
Mar. 20–29	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26	Washington (U.S.A.) Auto Show.
Mar. 23–27	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17	Coupe Meyan (Motor Boats).
Apl. 18–23	Nice-Rome.
May ...	Circuit des Ardennes (A.C. Belgium).
May ...	French Gordon-Bennett Race Eliminating Trials.
May ...	Guadarrama Hill Climb (A.C. Spain).
May 1–12	A.C. Bordelais Automobile Fortnight.
May 11–15	Milan Exhibition and Tourist Trial.
May 12	Perigueux Hill Climb (A.C. Dordogne).
May 12–15	Tours Tourist Trial.
May 14–15	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16–23	Circuit National Belge.
May 23–31	Aix-les-Bains Week.
June 7	Namur Week.
June 7	Spa Week.
June 17	Gordon-Bennett Race.
July 10	Mont-Cenis Hill Climb (A.C. Italy).
July ...	Speed Trials (*L'Auto*).
July 16–17	Ostende Motor Boat Races.
July 17	Antwerp–Ostende Motor Boat Run.
July 18–23	Ostende Week.
July 22	Kiel Motor Boat Races.
July 23–25	Lucerne Motor Boat Races.
Aug. 5–11	Paris–Deauville Motor Boat Race.
Aug. 12	Motor Boat Race for Gaston Menier Cup.
Aug. 13–14	Calais-Dover-Calais (motor boats).
Aug. 15	Calais-Boulogne-Calais (motor boats).
Aug. 28	Ventoux Hill Climb (Avignon).
Aug.	Paris Industrial Vehicles Trials (A.C. France).
Sept. ...	Deauville Automobile Meeting (*L'Auto*).
Sept. 2	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22	Leipzig Cycle and Motor Show.
Nov. 20	100 Kiloms. Trial (A.C. Algeria).
Dec. ...	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

A Legal Point to be Settled.

A good deal of discussion has taken place recently on the provisions of the 1903 Motor Car Act, from which it has emerged with tolerable distinctness that the measure contains an even larger number of ambiguous provisions than was at first supposed. Most of the provisions of the Act have already been discussed at some length, but there is one on which a conviction has already taken place (we cannot help thinking unjustly) on which no one seems to have concentrated his attention. We refer to the provision of Section 4, that "a licence must be produced by any person driving a motor car when demanded by a police-constable." This has already been held in the case of Mr. Smith, who appeared reluctantly before the magistrate at Marlborough Street, to mean that the driver of the car must have it about his person and produce it at once. Mr. Smith had his licence at home, and could have got it in a ten minutes' run if the constable had been willing to go with him, and he satisfied the magistrate that he was the possessor of a licence by fetching it. Nevertheless he was convicted. Now we submit that there is nothing in the phraseology of this section of the Act which can warrant this conviction. There is nothing which says the motorist must produce it instantaneously or immediately, or must have it about his person. Of course, if a motorist who resides in London and who in driving, say, through Newcastle-on-Tyne, was asked for his licence and had not got it, it might not be considered a reasonable excuse that he had left it at home at that distance, but where a driver or car owner, who happens to have forgotten his licence within a reasonable distance from his residence, says that he has got the licence at home and can produce it there, and if it is subsequently shown that he has duly taken out a licence, we very much doubt whether there is power to convict. We should certainly like to see the matter settled by a case in the Divisional Court. It is really intolerable to think that a car owner who happens to jump on his car in a hurry, say, to take a friend to the train, and forgets to put his licence in his pocket, is liable to be fined £5 through any police-constable who, perhaps knowing him to be a forgetful man, thinks he has probably left his licence behind him. We trust that the first automobilist of position who is summoned on this count will set up the defence we have suggested, and, if unsuccessful, will arrange to appeal on the case to the higher tribunal.

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Automobilism in India.

We have from time to time drawn attention to the extent to which the automobile movement is receiving recognition in India. We now hear from Mr. Rolfe, of Calcutta, that an Indian Automobile Association—The Automobile Association of Bengal—has been formed, with its headquarters in that town, and that it already numbers an influential membership. Mr. Rolfe sends us some interesting information with regard to the class of vehicles for which there is at present the greatest demand in India. Pleasure vehicles of all kinds are, of course, in request, but, in addition to them, there is a large field, he informs us, for power haulage, and he would like to receive particulars from manufacturers in a position to supply tractors weighing about two tons, and capable of hauling two or three trailers carrying a couple of tons each. The bridges in India are generally of rather weak construction, and about two tons on each vehicle is the maximum that can be taken over them. The tractor, he informs us, must be of simple construction and, of course, cheap. There also appears to be a market in India for motor tricycles of strong build, and developing about 4 h.p., for carrying about a hundredweight of mails, the ordinary journeys being about seventy miles on fairly stiff gradients, often of about 1 in 15 for ten miles, with extra steep gradients in places, for which change-speed gear would be required. This gives a good idea of the requirements which Indian customers are likely to make with regard to other vehicles, as, at any rate, in the part of India that Mr. Rolfe refers to hill climbing, is evidently an important matter in any automobile. Mr. Rolfe is at present organising a syndicate for arranging an automobile 'bus service, and in case it is satisfactorily carried through, intends ordering some Chelmsford steam 'buses.

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A Triumph for Everyone.

Every motorist in the Kingdom must be highly delighted at the result of one of the first cases brought under the new Act for exceeding the speed limit of 20 miles an hour. The case was one of the batch to which we referred last week as having formed part of the "bag" made by Superintendent Marks and his trusty lieutenant, Sergeant Lucas, in the neighbourhood of Cobham. Mr. H. Liddell, of Kensington, was one of those who fell into the police trap on the Portsmouth Road on January 17th, and a summons was issued against him by Superintendent Marks, who timed Mr. Liddell's car over a measured quarter of a mile with a stop-watch of the usual police kind, to the vagaries of which we have so frequently called attention in the past. Hitherto, stop-watches of this description have been regarded by magistrates as almost as infallible as the police witnesses who produce them. On this occasion the result was different, thanks to the manner in which defendant's case was conducted by Mr Firth and to the evidence of Mr. Swindley. In spite of the fact that Superintendent Marks' stop-watch had been supplied as he said by the ratepayers—we understand at his suggestion—it was, as Mr. Firth pointed out, a very cheap-looking affair, and Mr. Swindley conclusively demonstrated that by squeezing the starter slightly its action could be stopped and restarted at any moment. The precious stop-watch would accordingly have failed to pass the very first test to which chronographs are submitted at Kew or anywhere else where stop-watches are tested. To exercise slight pressure of this sort is just the kind of thing that an excited policeman, whose nerves were in a commotion lest his victim should escape him, would be likely to do, with the very probable result that several miles an hour would be added to the pace at which the motor car under observation would be made out to be travelling. The Chairman of the Kingston Bench was so impressed by this evidence that he at once dismissed the case, a result on which both Mr. Liddell, the Motor Union, who took up the case, those who conducted the defence, and every automobilist in the United Kingdom, are to be congratulated.

For it was the first case under the new Act which has been adequately defended, and the result has been to confirm in a striking manner what we have always said about the nature of the stop-watches on which convictions in these cases have been usually obtained in the past. Even the sacrosanct character which Superintendent Marks seemed to think attached to a stop-watch because it was supplied by the ratepayers, does not make it a reliable article. The number of motorists who have been convicted on the evidence of such stop-watches in the past ought to make many magistrates feel exceedingly uneasy in their minds, and would do, probably, but for the comfortable assurance that the moneys thus extracted from automobilists' pockets by unreliable stop-watches have gone to reduce the local rates.

The case is also very satisfactory as it shows that what we have always hoped and suggested would be likely to occur under the new Act is actually taking place; that is, that magistrates, recognising the superior penalties which they will be called upon to inflict, will take a more serious view of the evidence offered, and be less ready to convict. This attitude on the part of magistrates generally will have the effect of discouraging frivolous prosecutions. Statutes are made for the benefit of the public generally, not for the benefit of local ratepayers, and it is simply an abuse, as we have frequently urged, that a mere technical violation of the law, when no one is inconvenienced and no danger is caused, should be systematically made a ground for prosecution. We hail this action of the Kingston magistrates as an indication that the old bad spirit is likely to influence magistrates, who have to administer the new Act, to a much smaller degree in the future than has been noticeable before its introduction.

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Similar Moderation in Other Cases.

A SIMILAR sensible attitude has been adopted by metropolitan magistrates in other mainly technical cases which have been brought under the new Act. Thus, at the City Summons Court, a driver was arraigned for not having a lamp burning in such a way as to show his rear number-plate. He was only fined 5*s*., while Mr. Garrett, at the South-Western Police Court, imposed no penalty, but merely costs, in the case of another motorist who was summoned for having an incorrectly constructed number-plate. The very moderate penalty of 3*s*. and 2*s*. costs was also imposed by Mr. Hopkins in a similar case at Lambeth, and in one instance of an owner permitting an unlicensed driver to drive his car a penalty of 20*s*. was inflicted. These cases would not be of much importance in themselves, but when we bear in mind that they are all offences under the new Act, and that penalties in some cases amounting to £20 could have been inflicted, we submit that they are evidence of a change of spirit on the part of some of our magistrates which is of the happiest augury.

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A Record as Prosecutor.

IT is impossible to avoid noticing, in reference to Mr. Liddell's case, that prosecutions of a similar kind have been made a great speciality by Superintendent Marks. Indeed, one might be almost inclined to imagine that he owed his rather rapid recent advancement to the position of superintendent to the number of convictions of motorists and bicyclists that he has secured. A police superintendent is a rather highly placed official, and we do not know whether it is consistent with the general idea of dignity which prevails in the force for a superintendent actually to take personal part in police traps. It has, at any rate, hardly ever been done before, but evidently the sport is an exhilarating one, and Superintendent Marks has been unable to bring himself to abandon it with his elevation in position. Until last summer it was the Weybridge district which enjoyed the benefit of his ministrations, and nearly all the cases against motorists and bicyclists that came before the Chertsey Bench were brought by the then Inspector Marks. A favourite ambush of the inspector was the village pound at Byfleet, in which for long hours on Saturdays and Sundays he lay ensconced in a retreat that had been last previously tenanted by a more active, though not necessarily more intelligent, occupant. When no motor cars passed, the inspector pounced upon unfortunate bicyclists and summoned them, either for riding on the path or for proceeding at a furious rate of speed. At a still earlier period of his career Marks was quartered at Reigate, and the summonses taken out against bicyclists and motorists before the Reigate Bench were so unreasonably enormous in their numbers that the inhabitants of the town became indignant, and publicly petitioned the Joint Committee on the subject. With the transference of Superintendent Marks to Cobham, we may look forward at an early date to a similar protest by the inhabitants of that town, unless his ignominious failure in the prosecution of Mr. Liddell should induce him to adopt a change of tactics—a consummation devoutly to be wished! Sergeant Jarrett, of the Ripley Road, has been described in the daily press as the champion motor catcher, but his methods have, as a general rule, been open and above board, and he has exercised, at any rate, the discretion of seldom stopping cars that were proceeding at a reasonable rate of speed. We trust that as the prejudice against automobilists diminishes—and it is rapidly diminishing now—a mere record for motor catching will not in future lead to such rapid promotion as has occurred in the career of Superintendent Marks.

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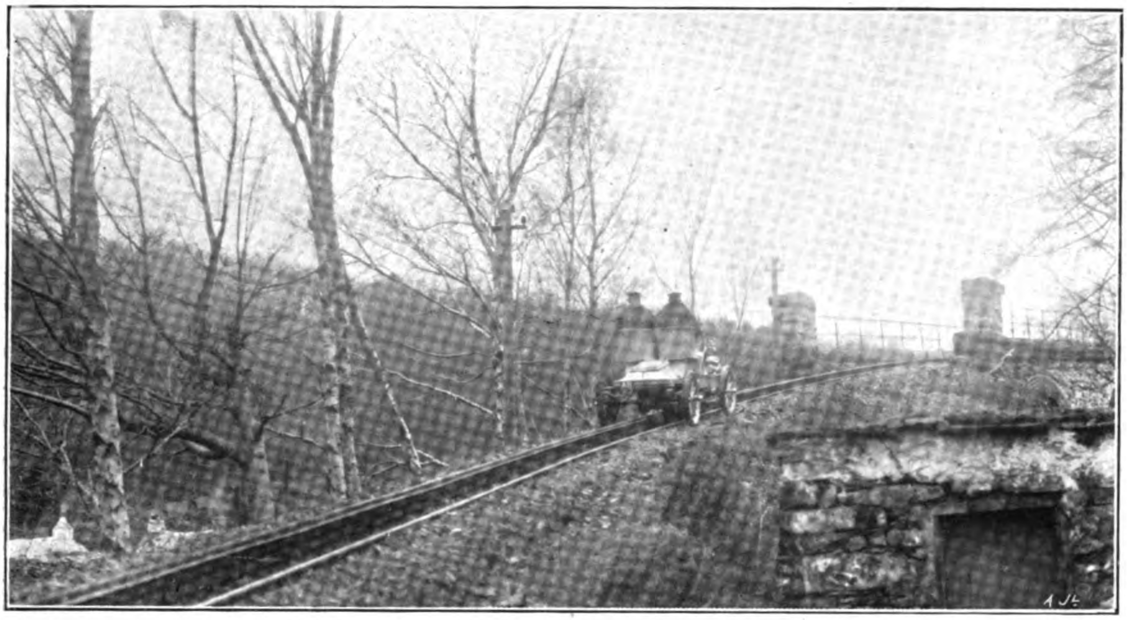
A Judicial Caution.

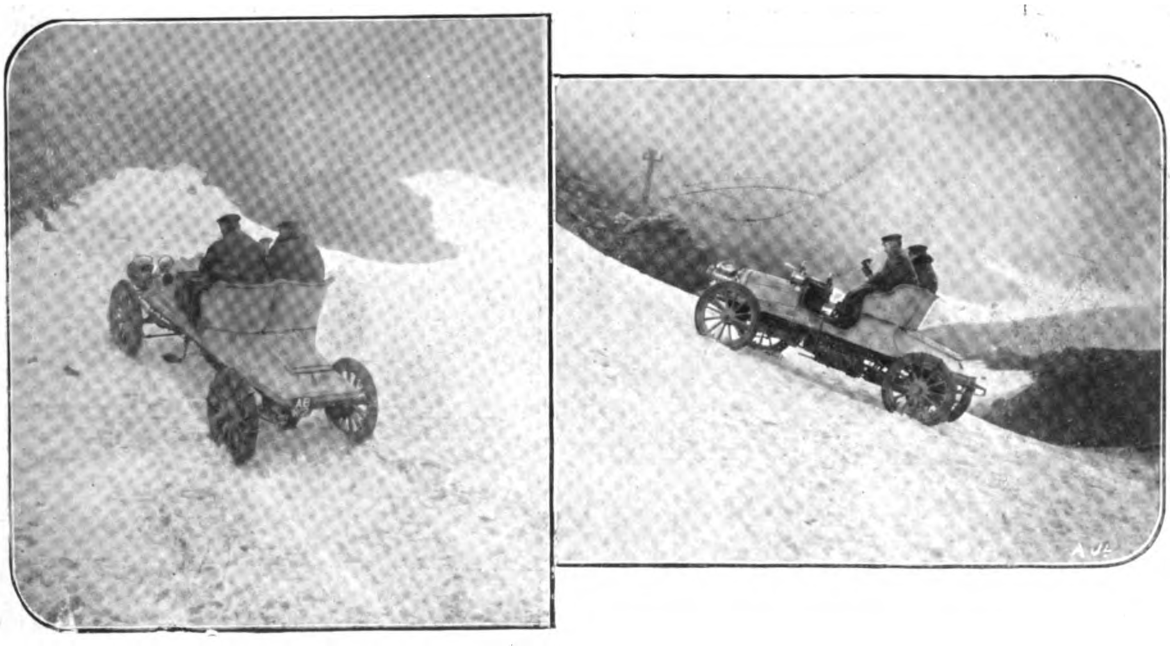
THERE is no doubt that Lord Lindley was very well advised in his remarks on the new Motor Car Act, and in emphasising the fact that the drivers who thought that because 20 miles an hour is the maximum speed prescribed, that *therefore* they are at liberty to drive at that speed on all and every occasion, were making a huge mistake. This is and always has been the point of view of every sensible and considerate automobilist, and when the few people who in the past have not duly observed it are converted by utterances like Lord Lindley's and by the fine which will probably be inflicted on them if they do not hearken to the voice of the charmer in this respect, the few still lingering public prejudices against the automobile will disappear. At the same time, when Lord Lindley was discussing the subject we should have been glad had a Judge of his weight seen occasion to express the hope that, in view of the greatly increased and drastic penalties provided by the new Act, Justices of the Peace who have to administer it will exact a higher standard in police evidence than that which they have hitherto been pleased to accept. Had he further added that deliberate arrangements between the authorities who control the police and the authorities who benefit by the payment of fines, resulting in the elaboration of police traps and the withdrawal of police over wide areas from their proper and ordinary duties, was opposed at any rate to the spirit of British jurisprudence, if not to the actual letter of British law, he would have done a service not only to the automobile movement but to the community at large. We are unable to understand the position of the judicial mind so often plainly evidenced in the Divisional Courts, which persists in regarding the pioneers of the new movement with almost as much prejudice as is displayed by farmers, butchers, and Justices of the Peace.

MOUNTAINEERING BY MOTOR.



CLIMBING SNOWDON BY AUTOMOBILE.—The start for the Climb.

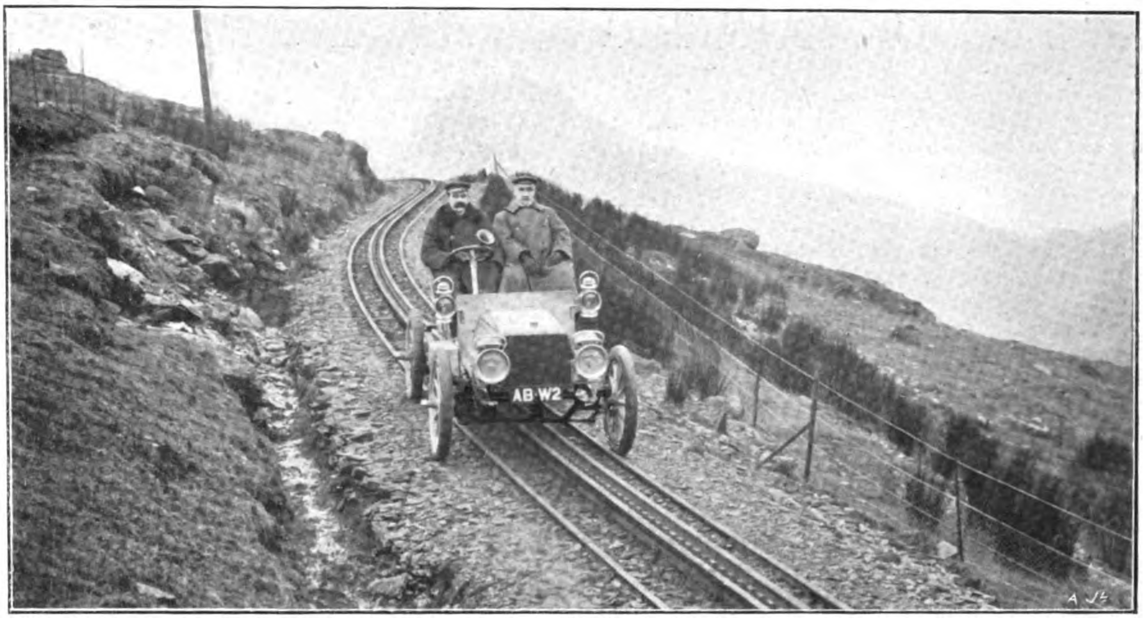
SOME two years ago our amusing comic contemporary, *Das Schnauferl*, came out with an imaginary diary of a motor car ascent of the Wetterhorn, or some such peak, illustrated by impossibly realistic photographs. Snowdon is not the Wetterhorn, but it is a pretty tough eminence to climb in the middle of winter, even for experienced mountaineers, as Professor Tyndall's account of how he and Huxley once scaled it in January will call to mind. But it has almost yielded to the modern automobile, and, thank goodness, to an English-built machine. Mr. Harvey du Cros, jun., and Mr. Charles Sangster thought they would like to see what an Ariel car could



Tacking for a higher point.

Driving on a frozen snow-drift.

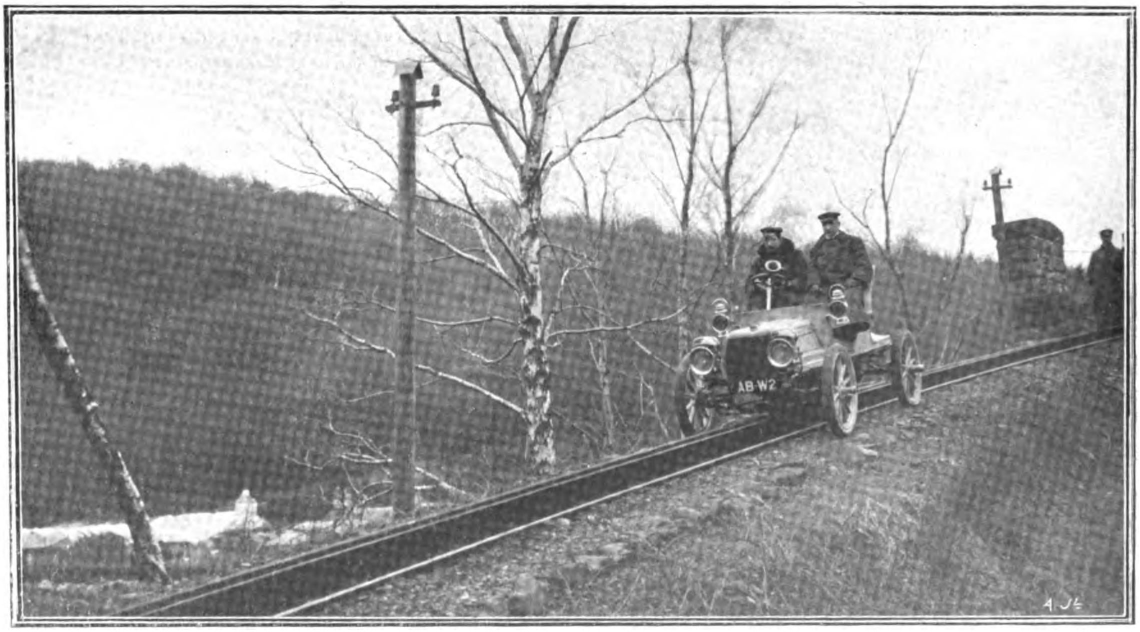
CLIMBING SNOWDON BY AUTOMOBILE.



CLIMBING SNOWDON BY AUTOMOBILE.—Half-way down the mountain on a gradient of 1 in 7.

do under exceptional circumstances. So they drove a 15-h.p. Ariel car over from Birmingham and arrived at the foot of the Snowdon Mountain Railway on January 27th. Mr. Aitchison, of the Snowdon Mountain Railroad Company, placed the line at their disposal, as the line formed the only possible route by which Snowdon could be scaled by a car; but even on the line the difficulties were enormous.

A great part of the gradient is 1 in 6 and 1 in 6½, and the ballast on either side of the metals is of the loosest and coarsest description that can be imagined. In addition, it has not been made up since the last train ran up in October, and floods and rains have cut deep gaps, over which the car had to be lifted by external assistance. The same was the case with the points, for the Snowdon Railway has a double rack between the rails, vertical flanges being arranged on either side of the rack, which project 7 in. above the rails, and at the points, of course, the car had to be lifted over them. In addition, there was a considerable amount of snow about, and a stout chain had to be bound round one of the driving wheels to prevent skidding on the



CLIMBING SNOWDON BY AUTOMOBILE.—A steep descent at the bottom on a gradient of about 1 in 5.

loose, slippery and half-frozen ballast mixed with snow, so that on the whole the climb was one of the most difficult ordeals to which a motor-car could possibly be subjected. Notwithstanding this, Mr. Harvey du Cros and Mr. Sangster, on the first day, reached the half-way station, about half the distance to the summit, and, on the succeeding day, reached and passed Clogwyn, more than three-quarters of the way to the top, where their further progress was stopped by an enormous snow-drift which failed to yield to the exertions of the diggers who attempted to remove it, and further progress was rendered impossible. It was at this point that the photograph forming our frontispiece was taken. The venture was an exceedingly plucky one, as the motor-mountaineers had not only to contend with the difficulties of the route, the frightful gradient, and a violent storm that was raging all the time, but the car, at times, almost hung over precipices 1,000 ft. deep. Mr. Harvey du Cros intends trying the experiment again in the summer, when there are no snow-drifts about, and, considering that he passed the last of the three stations before the summit, and had overcome the steepest inclines, there is little doubt that he would be successful in reaching the summit when there is no snow to impede him, and the ballast on the line is in its normal condition. Even as it is, the almost-completed exploit forms an admirable testimonial to the hill-climbing capacities of the modern car. If a 15 h.p. British-built automobile can climb nearly to the summit of Snowdon on rough ballast at the present time of year, this means that there is no hill with a road over it that the modern motor vehicle of moderate power cannot, under suitable weather conditions, surmount with comfort and ease.

THE MIEUSSET PETROL CARS.

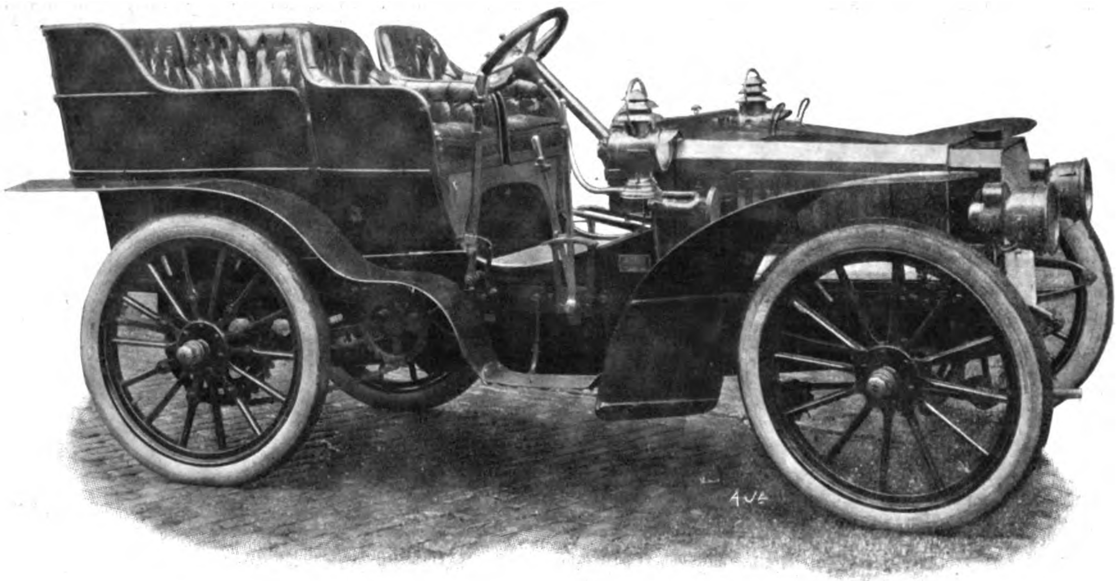


Fig. 1.—A 16-20-h.p. Mieusset Petrol Car.

The Mieusset cars, which are built at Lyons by a company who are chiefly known in France in connection with the manufacture of fire engines and other apparatus for salvage corps, are quite new to this country, and are now being introduced over here by the Farman Automobile Company, of Long Acre. They are made in various sizes ranging from a voiturette with the single cylinder engine up to racing vehicles having six-cylinder engines of about 70-h.p. Except in the voiturette, which is made either with a live axle or with side chains, they are all of the chain-driven type, and are, we understand, similar in general design to the 16 to 20-h.p. vehicle, which we have recently had an opportunity of examining, and from which our illustrations are taken. This car does not differ materially in outward appearance from many other vehicles of the same power, but is nevertheless of interesting construction in several respects, and is the result of much original work and experiment on the part of the builders. Special attention is drawn to the form of frame used, to the manner in which the cylinders are constructed, to the automatic carburettor, to the arrangement of the clutch, and to the size of the teeth on the wheels in the gear-box. The single-cylinder voiturette has a 6-h.p. engine, which, like all the larger engines, has a low tension magneto ignition system, and mechanically-operated inlet-valves; it is the only Mieusset model which has but three instead of four forward speeds, in addition to a "reverse." The twin-cylinder car has an engine of 8 to 12-h.p., and, as we have already indicated, has side chains driving the rear-wheels. No less than three different sized cars with 4-cylinder engines are made, the one being smaller than the car we are about to describe, and the other larger, their respective powers being 12 to 16-h.p. and 20 to 25-h.p. The standard cars have either detachable tonneau bodies, or those known as Roi des Belges, the rear seat in which will also be detachable. In all these cars a separate and smaller hand-lever, which is mounted alongside the change-speed-lever, is used for introducing the reverse.

The 16 to 20-h.p. car is shown in Fig. 1, and the engine is seen both from the right- and the left-hand sides in Figs. 2 and 3. The engine and the gear-box are fixed to an underframe, which forms part of the main frame, and is securely attached to it. The entire frame is built up of rolled steel members, which have an Γ-cross-section, and a sheet metal apron is fitted to form a dust-proof cover beneath the front of the car. The frame is carried on the usual side-springs, which lie beneath its side members. Both axles are solid forgings, and the wheels run on plain bearings having dust-proof fittings. The back axle is connected with the frame by adjustable radius rods as usual, and the ends of the front axle, which bows down beneath the engine, are bifurcated to form the steering-head above and below the stub-axle forgings. Irreversible, worm steering-gear is fitted in connection with the usual wheel, mounted upon a steering pillar having an unusual amount of rake, and the connections with the stub axles are of very substantial construction. The transverse rod which ties the two steering heads together is provided with an adjustment so that the front wheels can be brought parallel with one another if they should at any time cease to be so.

The cylinder casting for each pair of cylinders is made of a special aluminium alloy, although their outward appearance does not indicate any such unusual construction. We are told that the cylinders themselves are formed by cast steel liners which are forced into the aluminium castings. The cylinders have a bore of 103 mm., and the stroke is 130 mm. The inlet-valves, which are interchangeable with the exhaust-valves, are arranged on the opposite side of the cylinders to them, the seats for these valves being made separate from the cylinder castings, and forced into place in them under considerable pressure. The inspection plugs above the valves, each pair of which is held down by a yoke, A, and one nut, are made of the same metal as the main castings; apparently, to judge from their weight, the alloy contains somewhere about 50 per cent. of aluminium, though its composition is kept secret by the makers. The cylinder castings are bolted to the upper portion of the crank-chamber in much the usual way, and the valves are operated by cams on two separate cam-shafts. The large wheels, B, on the front ends of these cam-shafts, by which they are driven from a pinion on the crank-shaft, are seen in Figs. 2 and 3. The cam-shafts are arranged, together with the bushes which form their bearings, in such a way that they can be drawn out forward without disturbing the engine, it being only necessary on the car to remove the honeycomb radiator, C, and to unscrew the bolts holding the end bearings in place. Half-compression cocks are fitted into the heads of the cylinders, and low-tension make-and-break igniters are fixed into the inlet-valve chambers on the right side.

The igniters are operated by cams on the same shaft as those which actuate the inlet-valves, and these cams engage with levers, D, which pass through slots on the side of the crank-chamber casting, as seen in Fig. 2. The levers are fulcrumed on a rod, D^1, which can be moved inward and outward, toward or away from the engine, to vary the time of ignition in the well-known manner; the connection between the levers and the igniters are also clearly seen in Fig. 2. When the vertical rods, D^2, connected with the horizontal levers are raised by the cams, the electrical current is completed in the igniter by a weak external spring, and when the cam allows these rods to fall they do so under the action of a more powerful spring, D^3, which causes small hammers, D^4, on their heads to break the circuit in the igniter. The time of ignition is varied by a small lever mounted above the steering-wheel, the connection being made with it through the hollow steering pillar by the lower external sleeve, E, seen in Fig. 1. The magneto, F, which generates the current, is fixed on the opposite side of the engine (Fig. 3), and the current is led from it by a bare copper wire, F^1, running over a porcelain insulator, F^2, to chopper switches on each igniter. It is driven at the same speed as the engine by gearing from the large wheel, B, on the exhaust cam-shaft; all these larger gear-wheels in front of the engine are built up of fibre, faced with phosphor bronze.

A second small lever above the steering-wheel, lying just beneath the timing-lever, is connected in a similar manner through the hollow pillar with a throttle-valve, G, in the induction-pipe; the tube passing down the pillar is connected through a slot in it with a sliding-sleeve, G^1, engaging with the forked end of the lever, from which the connecting rod passes to the throttle-valve, G. This throttle-valve acts entirely independently of the centrifugal governor, H, which is fitted into the large wheel on the exhaust cam-shaft, and is connected by a lever, H^1, both with an accelerator lever near the base of the steering-pillar behind the dash, and with another throttle-valve, H^2, in the carburettor itself. The carburettor is of the float-feed type, and is rendered automatic on a somewhat similar principle to that employed in the well-known Krebs model. The only heat imparted to it is derived from a jacket around the mixing-chamber, J, through which part of the exhaust gases are led by a small pipe, J^1, communicating with the main exhaust-pipe fitting, K. An adjustable auxiliary air valve, which can be set by hand, forms a portion of the carburettor, and the automatic valve, which maintains an approximately constant degree of vacuum on the engine side of the carburettor, is contained in a separate fitting, J^2, and admits more or less auxiliary air through a small pipe, J^3, entering just beneath the hand-controlled throttle-valve, G. It is claimed for this carburettor that it maintains a sufficiently constant richness of mixture to enable the engine to run satisfactorily at any speed between 50 and 1,200 revs. per min. The carburettor, and the parts which connect the throttle-valves with the governor and with the hand-levers, are of very substantial construction. The speed of the engine is normally controlled by hand by opening or closing the second throttle-valve and by timing the ignition, but the accelerator lever is arranged so that it can vary the strength of the spring, H^3, acting against the governor, and thus enable the governor to maintain any desired constant speed.

A centrifugal circulating pump, L, is fixed just behind the magneto, on a lower level than it, and this is driven by a large spur-wheel fixed to the flywheel. The water is drawn from the bottom of the multitubular radiator, C, is delivered by a branched pipe, C^1, to the bottom of each of the jackets, and is forced out through another branched pipe, C^2, at the top of the jackets back to the top of the radiator. The radiator is constructed in just the same way as an ordinary fire-tube boiler, no solder being used in its manufacture, and the fan, C^3, which lies close behind it, is fitted to it in such a manner that the pin upon which it revolves can be moved up or down, and fixed, in a slot to adjust the tightness of the flat belt, C^4, connecting it with a pulley on the crank-shaft. The exhaust gases are led through a single pipe, K^1, to a large exhaust box placed longitudinally on the left side

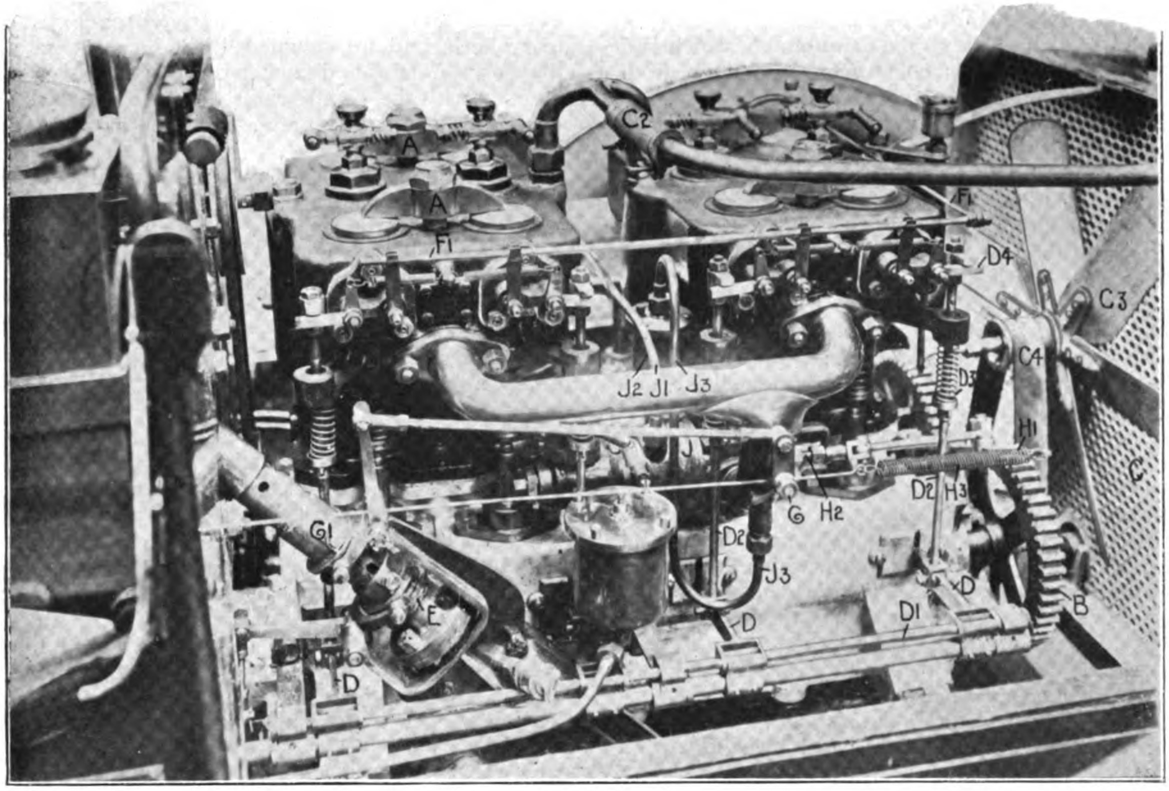


Fig. 2.—View of the 16–20-h.p. Mieusset Engine, from the right side.

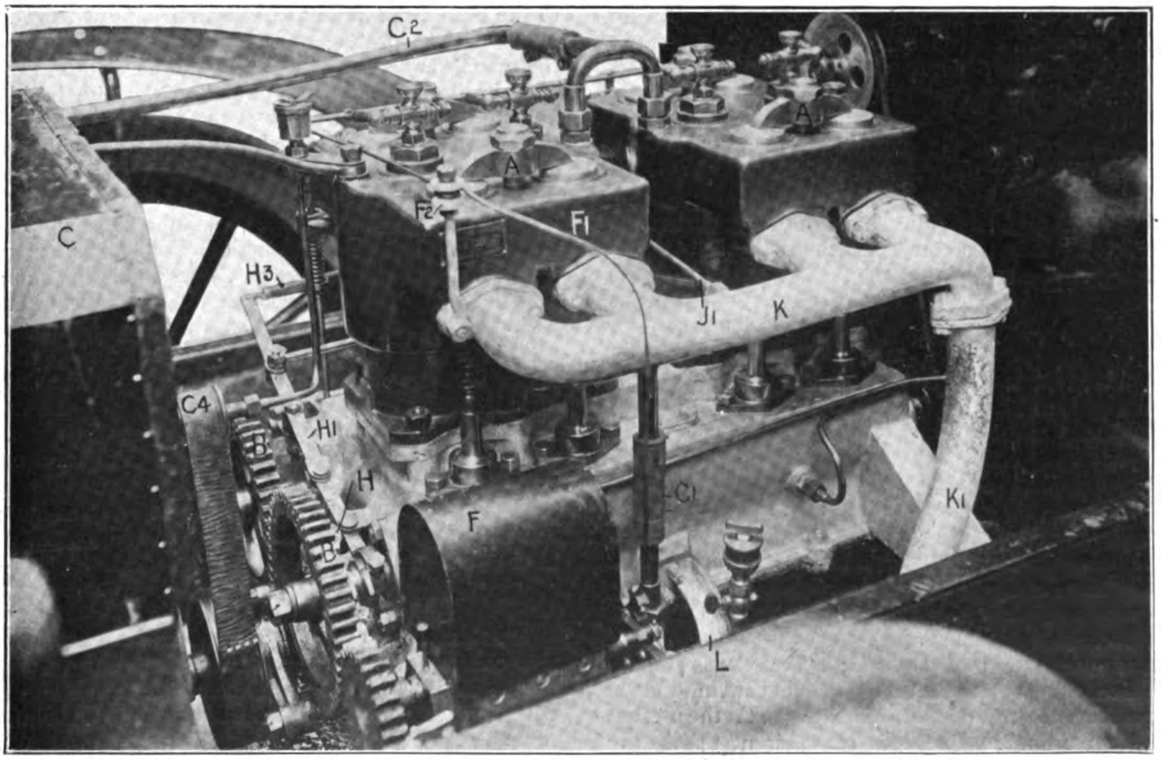


Fig. 3.—View of the 16–20-h.p. Mieusset Engine, from the left side.

of the car, and are finally allowed to escape through another pipe passing rearwardly from it.

The external member of the main clutch, which is of the ordinary cone type, is constructed separately from, and is bolted to, the flywheel. The inner cone is made of aluminium, and has a leather friction face. It can be easily taken out bodily for having a new leather fitted to it if required, and it is not necessary to disturb either the flywheel or the gear-box for the purpose, because a wide flange coupling, having an intermediate loose block between the two flanges, is introduced on the first-motion-shaft. The gear-box itself is rigidly fixed to the frame, and has two sliding sleeves mounted upon the first-motion-shaft. Each sleeve carries two gear-wheels, as in the well-known Mercedes practice; the second-motion-shaft is placed to the left of the first-motion-shaft and is connected with the differential countershaft through bevel-gearing as usual. The four forward gears are introduced alternatively by a single side lever, which can be moved forward or backward in either of two parallel slots in the quadrant. The "reverse" lever is shorter than the other lever, and is fitted just outside the same quadrant. It brings an intermediate spur-wheel, which lies in the base of the box, into mesh with the first-speed-wheels on the two gear-shafts. The gear-wheels are made of very hard steel, but are not hardened after the teeth are cut; as we have already said, they are large wheels and have wide teeth of a coarse pitch.

A metal-to-metal band-brake is mounted on the countershaft, and is controlled as usual by a foot pedal to the right of the steering pillar, and the clutch pedal. The usual side brakes act direct upon the hubs of the rear wheels, and are actuated by a hand lever outside the car. A pawl-and-ratchet device is arranged in conjunction with the countershaft brake to act in the same manner as a sprag, by preventing the car from running backwards on a hill.

The engine is lubricated by a mechanical feeder which is fixed to the dashboard, and is driven by a belt from the rear end of the exhaust cam-shaft. The gear-box and the circulating pump are fed with grease from a nine-feed greaser on the dash, each of the feed pipes being fitted with a cock so that any desired bearing can be fed separately when necessary. The other bearings on the car have separate lubricators arranged in conjunction with them, and they are all of the plain type.

The car appears to be well and strongly constructed, and is fitted with a comfortable body, accommodating five persons. The petrol tank, which has a capacity of ten gallons, is fitted beneath the driver's seat, and the fuel flows by gravity from it to the carburettor. The wheel base is 7 ft. 3 in., the track 4 ft. 6 in., and the wheels are shod with 910 by 90 mm. pneumatic tyres. The engine runs at a normal speed of 800 revs. per min., and with the standard-sized chain wheels—22 tooth on the countershaft and 35 tooth on the rear wheels—the various speeds provided represent about 12, 17, 28, and 40 miles per hour, and about 12 miles per hour "reverse."

A NEW GARAGE, SHOW-ROOMS, AND AUTOMOBILE FACTORY IN LONDON.

AMONG the many palatial premises recently erected and equipped for the benefit of automobilists in our somewhat cramped metropolis, those of the Lacre Motor Car Company—who, before their removal from Long Acre, were well known to many of our readers as the Long Acre Motor Car Company — deserve special mention, on account of the completeness of the accommodation which they afford. The Company's new home is in Poland Street, which is one of the turnings out of Oxford Street, and lies quite a short distance east of Regent Street. It is, therefore, uncommonly well situated considering that it is quite a large factory in addition to being a garage for the storage of customers' vehicles and a large show-room, in which Wolseley cars—for which they are the sole London agents—figure most prominently. The building has an unusually large frontage in Poland Street, and a back entrance also through Livonia Street out of Berwick Street. No expense is being spared to secure the comfort of clients whilst on the premises, and a very thorough system has been adopted for ensuring the safe storage, not only of the cars themselves in the garage, but also of such portable accessories as tools, spare parts, &c. The Company have equipped certain portions of the building with a very fine plant for the manufacture of complete cars, of bodies of all kinds, and for carrying out any kind of repairs which may be necessary; and they also stock a complete set of spare parts for the Wolseley cars, in addition to the usual accessories of every description. At the present time a large number of chassis of different makes are being fitted by them with special bodies of their own design, not a few of these being neat convertible broughams, for town and general use; a feature, too, is made of bodies having side entrances, with a single step, to the rear seats, and of detachable canopy tops, affording complete protection in bad weather. The whole of the machinery is run by electric motors, and an immense electric lift connects the main floors. The building is heated throughout by hot water, including the painting and varnishing rooms, which are so arranged as to ensure a very perfect finish being obtained for all the carriage work.

The Company intend to make a special point of courting the closest inspection from their customers, and have laid out the various departments in such a way that they can be visited by the public without interfering with the progress of the work. A motorist can, therefore, select his own materials, watch the progress of the work which is being carried out for him, and witness any tests which may be made with the engine, or with the car, before delivery. All the various departments are connected together by telephone, the Company can be communicated with at any time by either of the public telephone services, and motorists can obtain access to the building, and have their wants attended to, at any hour during the day or during the night.

A FORTNIGHT ago we recorded the registration of a new company under the title of the Sampson Leather Treads and Tyre Company, Limited, for marketing the Sampson leather treads in Great Britain. Captain Theo. Masui, of 1, Hanover Court, Hanover Street, W., who has already been associated with these treads in this country, has, we understand, been appointed sole representative for the United Kingdom.

SOME FURTHER DETAILS OF THE CROSSLEY PETROL CAR.

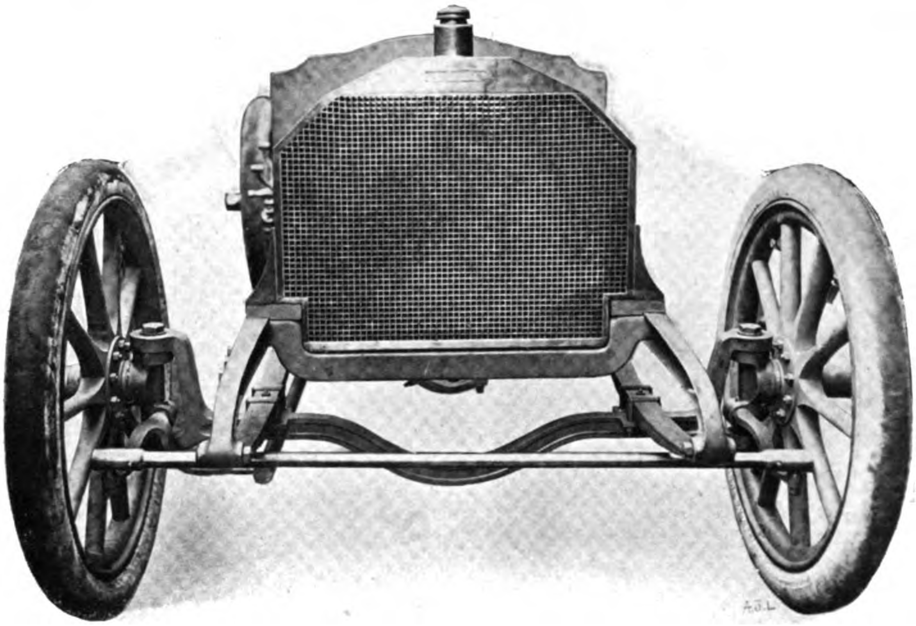


FIG. 7.—Front view of the Crossley Chassis. (The Starting Handle is not fitted in this view.)

FURTHER illustrations of the Crossley chassis are given in Figs. 7, 8, and 9, the indicating letters on which correspond with those previously used by us. Fig. 7 and Fig. 8 are reproduced from photographs taken from the front and from the rear respectively, while Fig. 9 is a side elevation. In Fig. 9 the chassis is fitted with a tonneau body, the engine is enclosed by its bonnet, and the shape of the sloping floor in front of the driver's seat is shown. In this drawing, too, the change-speed-lever, Q^1, the brake lever, V, the hand-levers, X and X^1, above the steering wheel, the clutch-pedal, P, behind which is the brake-pedal, U, and the water-jacketted lubricator on the dash, will be noticed.

The Steering Gear, together with the pillar and

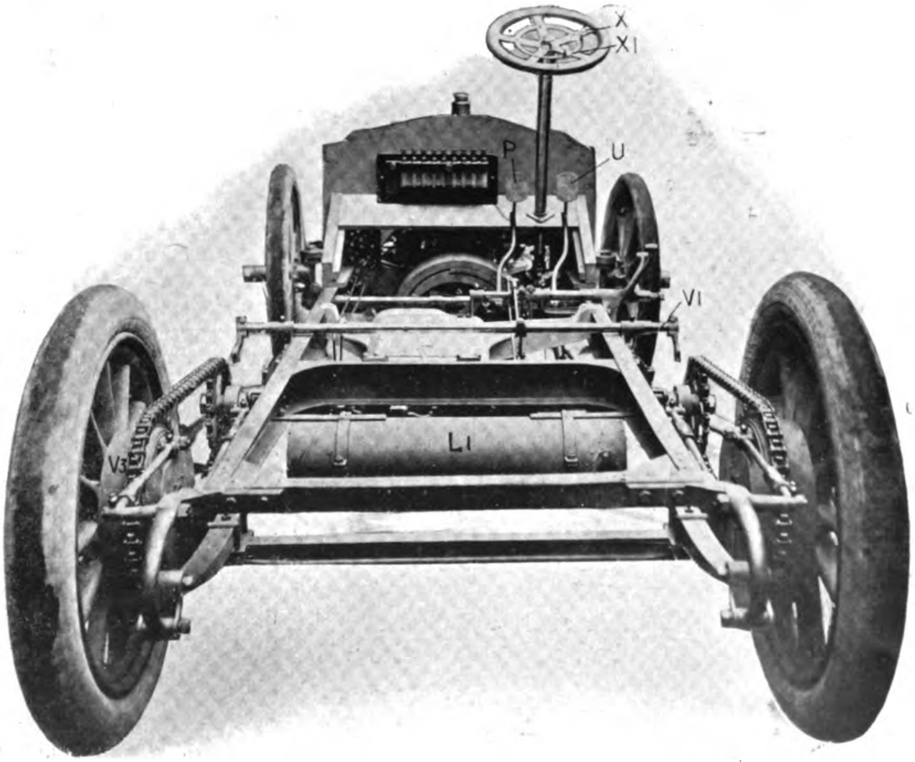


FIG. 8.—A view of the Crossley Chassis from the rear.

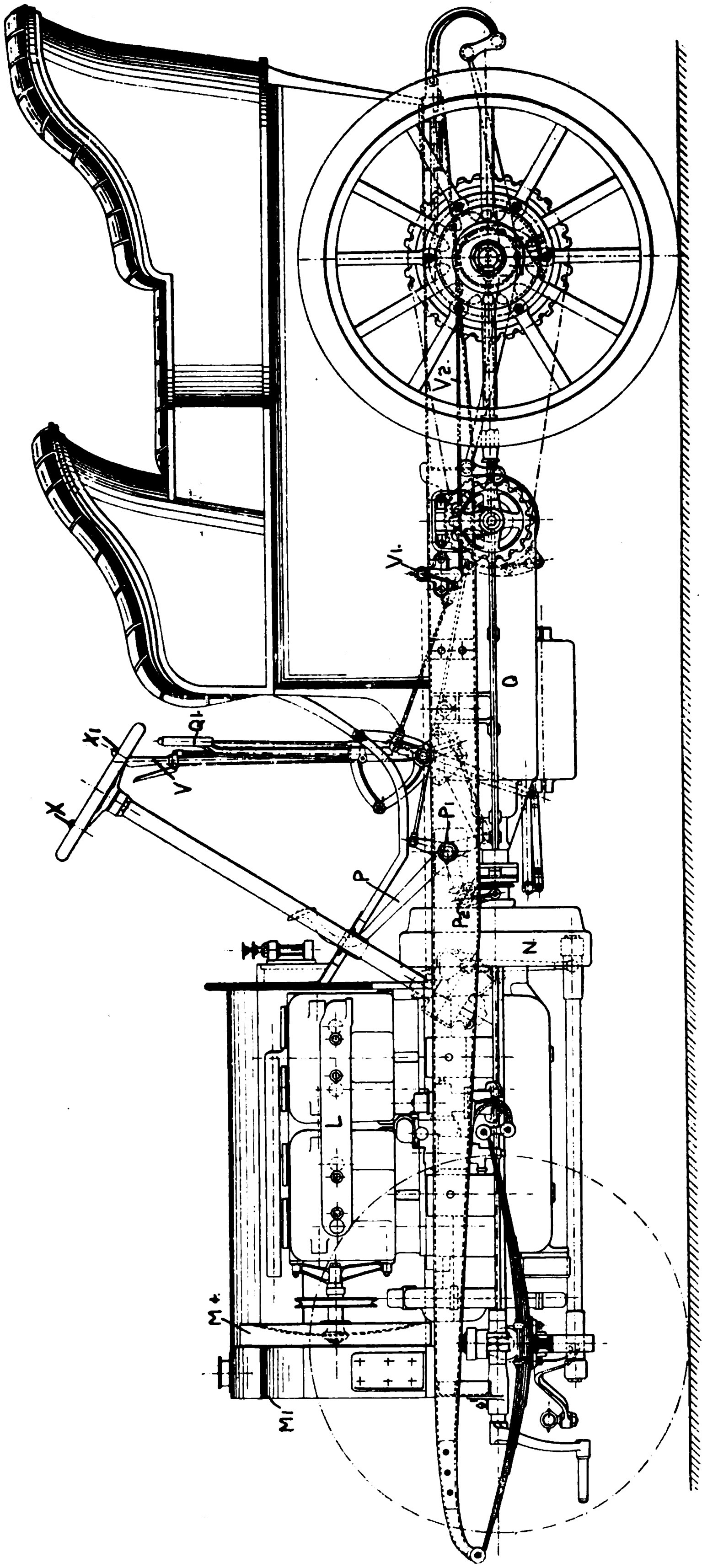


Fig. 9.—Side Elevation of the Crossley Petrol Car.

wheel, are seen in Figs. 10 and 11, the former illustration being reproduced from a photograph, and the latter being a sectional drawing. The pillar is formed of a tube, W, which carries the wheel at its upper end, to which is fixed a toothed ring, W^1, acting as a circular quadrant for the hand levers, X and X^1, controlling the engine. The tube, W, at its lower end is securely keyed and fixed by the split clip, W^8, to the sleeve forming a part of the worm, W^2, this sleeve being mounted in bearings in the casing which encloses the gear. A ball thrust bearing is mounted inside the case both above and below the worm, and these ball bearings can be adjusted by the threaded sleeve, W^4, which fits into the casing as seen. The tube, W, passes through a flanged sleeve, W^3, which is fixed to the floor and gives an additional support to the pillar, over and above that afforded by bolting the casing to the side of the frame. The worm, W^2, meshes as usual with the toothed sector, W^5, secured to the short shaft, W^6, to which the steering arm, W^7, is fixed.

The hand-lever, X, is fixed to the top of a spindle, X^2, which passes down through the centre of the steering pillar and through the worm, W^2. It is surrounded by a tube, X^3, which carries the other hand-lever, X^1, at its upper end, and passes out beneath the steering gear. Both the rod, X^2, and the tube, X^3, are fitted with screw threaded sleeves at the lower ends, and the nuts, X^4 and X^5, ride on these threads, being thus caused to travel up or down as their respective hand-levers are moved over the quadrant, W^1. The nut, X^4, engages with a lever pivoted at X^6, and this is connected through the rod and bell-crank, X^8, with the engine control which it regulates; the nut, X^5, is similarly connected with a rod, X^9, through a lever fulcrumed at X^7.

As we have already said, the steering gear is connected with the front wheels, in the usual way, by very substantial tubes, and back-lash at the joints is prevented by short strong springs which are at all times in a state of compression.

The Main Clutch, which is shown in Figs. 12 and 13, fits inside the flywheel, N, on the rear end of the crank-shaft, D. The projecting end of the shaft carries the casting, N^1, which is free to revolve upon it, and is fitted with a long brass bush for this purpose. The shape of this casting is best seen in Fig. 13, and in the elevation it will be noticed that at its upper end it carries the brake-shoes, N^5, pivoted to it. At its lower end a socket, N^2, is secured to it by the bolt, N^3, and the socket has left- and right-hand screw threads formed inside it. Before the bolt, N^3, is inserted, the socket, N^2, can be turned round about its axis so as to draw the lower ends of the two levers, N^4 (and, therefore, the lower ends of the shoes, N^5), nearer together or to press them further apart, it being pivotally connected with those levers as seen in the elevation. The levers, N^4, are connected together at their upper ends, N^6 (Fig. 13), by a strong helical spring, N^6 (Fig. 12), and they are connected by links with the lower ends of the shoes, N^5. Centrally, these levers, N^4, carry small rollers, N^7, which are normally clear of the casting, N^1. A sliding wedge, N^8, which rides on a feather-key on the sleeve, N^1, is so arranged, however, that its sloping surfaces can be brought into contact with the rollers, N^7, and so force the levers, N^4, outwards against the action of the spring. The effect of this action is to bring the lower ends of the shoes, N^5, nearer together, and thus withdraw their cast-iron friction faces away from the inner face of the fly-wheel, N. The wedge piece, N^8, is formed with a groove for the split collar, N^5, to ride in, and this collar is engaged by the forked lever fixed to the rocking-shaft, P^2, on the chassis. It will be seen that the spring, N^6, which is adjustable, tends to force the brake shoes outward, that the contact surfaces of the shoes only extend over about one half of the complete circle, and that the end-thrust imposed by the wedges, N^8, is taken by a ball-thrust bearing fitted between the flywheel and the casting, N^1. The bearing inside the casting is lubricated from the grease-cup seen in Fig. 13, and the collar, N^8, from another grease-cup, which is visible in Fig. 12.

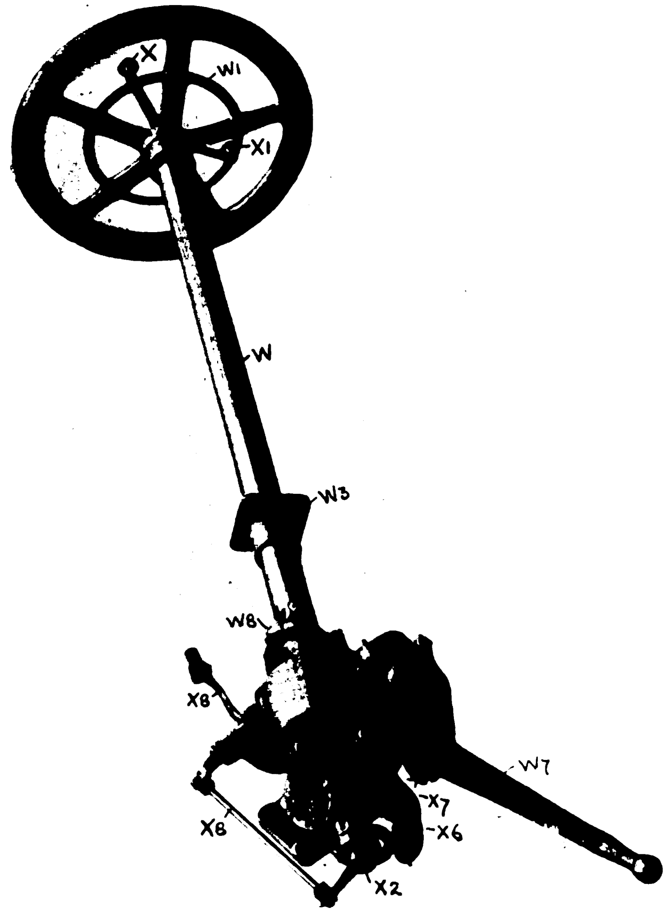


FIG. 10.—View of the Crossley Steering Gear.

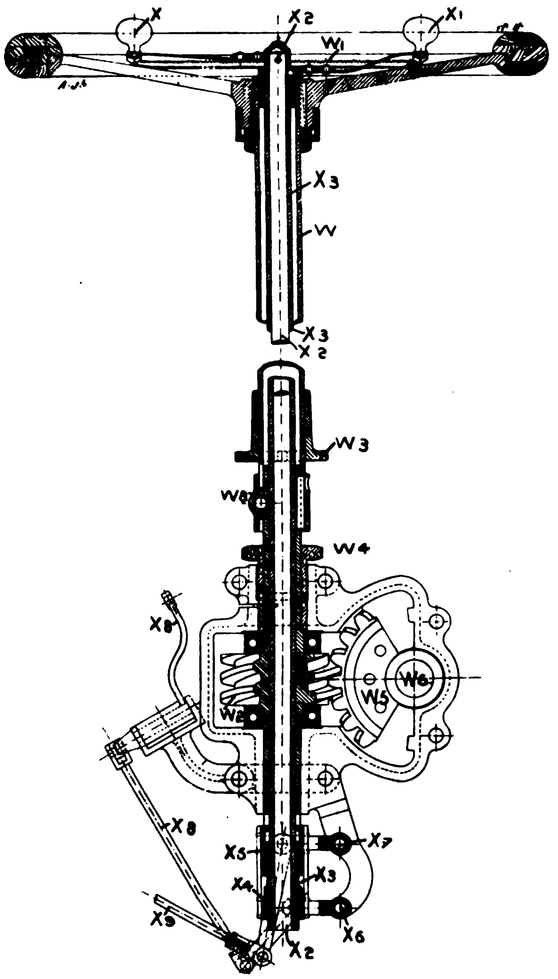


FIG. 11.—Vertical Section of the Crossley Steering Gear.

The precise arrangement of the clutch-pedal, P, in relationship with the main-clutch, is very clearly shown in Fig. 14. The pedal is mounted upon the shaft, P^1, which passes across the chassis and is rigidly fixed to a short arm, P^3, projecting forward from it. The fork engaging with the collar, N^8, by the pins, P^5, is mounted upon the transverse shaft, P^2, and it carries an eccentrically mounted steel roller, P^4, with which the end of the lever-arm, P^3, engages. When the pedal, P, is depressed, the arm, P^3, acts upon the roller, P^4, and causes the clutch fork to turn about its axis, a very powerful leverage being in this way obtained. When the pedal is fully depressed the roller, P, rests against the end of the lever, P^3, and therefore can exert but little force on the pedal against the driver's foot, very little exertion consequently being needed for holding the clutch out of engagement.

The Change-Speed Gear is further illustrated in Figs. 15 and 16, and the flexible jaw coupling, R^1, which connects it with the sleeve, N^1, of the main clutch, is clearly shown (sectionally) in Fig. 14. The first-motion-shaft R, has a square section inside the gear-box, Q, and its forward end takes a bearing inside the sleeve of which the bevel wheel, T, and the jaws clutch member, T^1, form parts. The three spur wheels, R^2, R^3, and R^4, are mounted upon a sleeve, which is free to slide upon the square portion of the shaft, R, and the front end of the sleeve carries jaw-clutch members, R^5, which engage with the similar jaw-clutch member, T^1, when the sleeve is moved to its furthermost position rearwardly. The second-motion-shaft, S, carries three spur-wheels, S^2, S^3, and S^4, which correspond with the wheels, R^2, R^3, and R^4, to give the first, second, and third forward speeds respectively. This shaft terminates at its rear end in the bevel-wheel, S^1, which meshes with the wheel, T^7, on the differential gear, whilst the direct-through-bevel, T, meshes with the other bevel-wheel, T^6, alongside it. Except on the top gear the power is transmitted from the first-motion-shaft, R, to the second-motion-shaft, S, and from it through the bevels, S^1 and T^7, to the shell, T^2, of the differential. On the top gear, however, the jaw-clutch members, R^6, engage with those, T^1, and the power is then transmitted direct through the bevels, T and T^6, to the differential. In Fig. 15 the top gear is in use, and in our previous illustration—Fig. 6—(and in Fig. 16) the reverse gear is in operation. The "reverse" is obtained by a pair of wheels, R^9, which are mounted together on a sleeve that is free to slide upon a shaft, R^8, in the base of the gear-box. This sleeve is at all times connected with the sleeve on the first-motion-shaft by the fork casting, R^7, and both in turn engage with the sliding rod, Q^2, which is connected with the hand-lever, Q^1, by the arm, Q^3 (visible in Fig. 14.) One of the intermediate wheels, R^9, is at all times in mesh with the spur-wheel, R^3, and the other

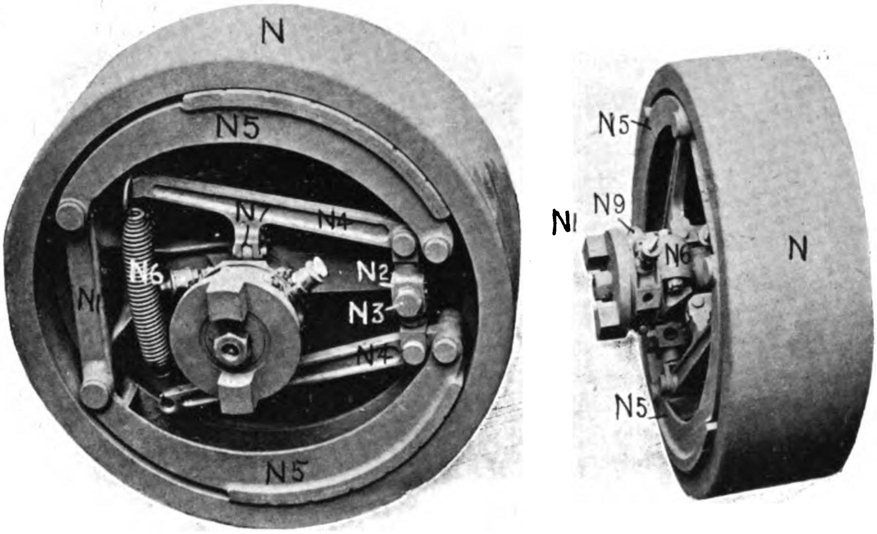


FIG. 12.—Two views of the Crossley Expanding Clutch.

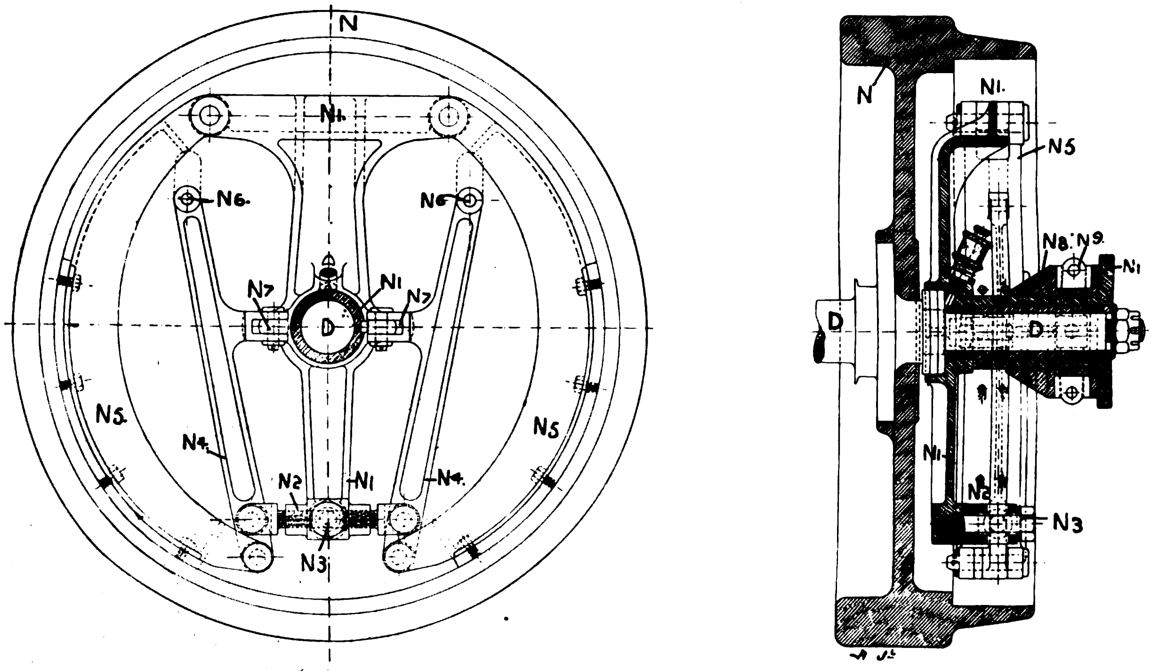


FIG. 13.—Front elevation and cross section of the Crossley Clutch.

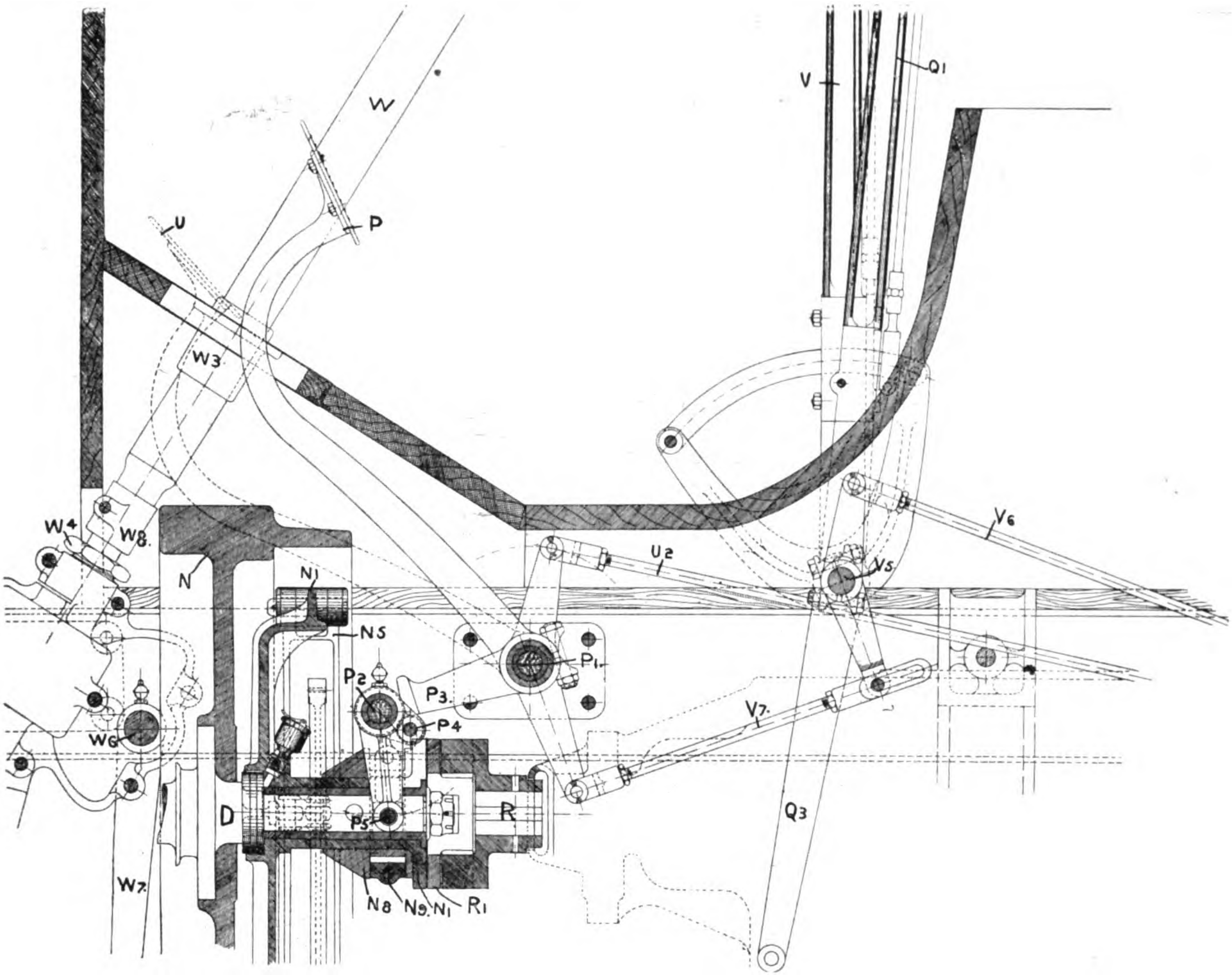


FIG. 14.—The arrangement of the Operating Levers and Pedals on the Crossley Petrol Car, showing the inter-connection of the Brakes with the Clutch.

comes into gear with the low-speed wheel, S^2, on the shaft, S. The thrust of the bevel, T, is taken by the ball-bearing, R^8, and that of the bevel, S^1, by the ball bearing, S^5. The outer member of the differential gear is also arranged between ball-thrust-bearings, T^8, which take the end strains imposed on it by the bevels, T^6 and T^7. All six bearings are ring lubricated, and have small oil troughs, Q^4, formed in them for this purpose. Each of the four outside bearings, too, have grooves, Q^5, arranged so as to catch any oil which may find its way through them. As we have already said, flexible couplings, T^4, are introduced into each half, T^3, of the differential countershaft, and ball-bearings, T^5, are fitted at either end close up to the sprocket-wheels driving the side chains. The gear-box is provided with an unusually large cover, which enables a thorough inspection to be made at any time.

The four forward gears on the standard car represent normal speeds of about 11, 22, 35 and 48 miles per hour respectively, when 20-tooth sprockets are fitted on the countershaft.

The Brakes on the Crossley car are all double-acting, have metal-to-metal friction surfaces, and are very powerful. The foot-pedal, U, is connected with the brake-band, U^1, by the rod, U^2, as seen in Fig. 14, the band pressing upon the drum, U^3 (Fig. 16). The pedal

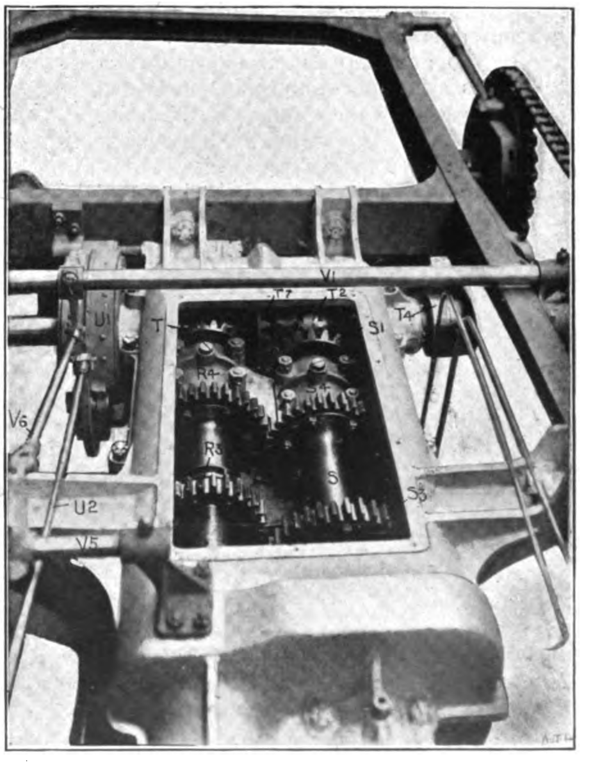


FIG. 15.—View of the Crossley Gear Box, fixed in place in the Car, with its large Inspection Cover removed.

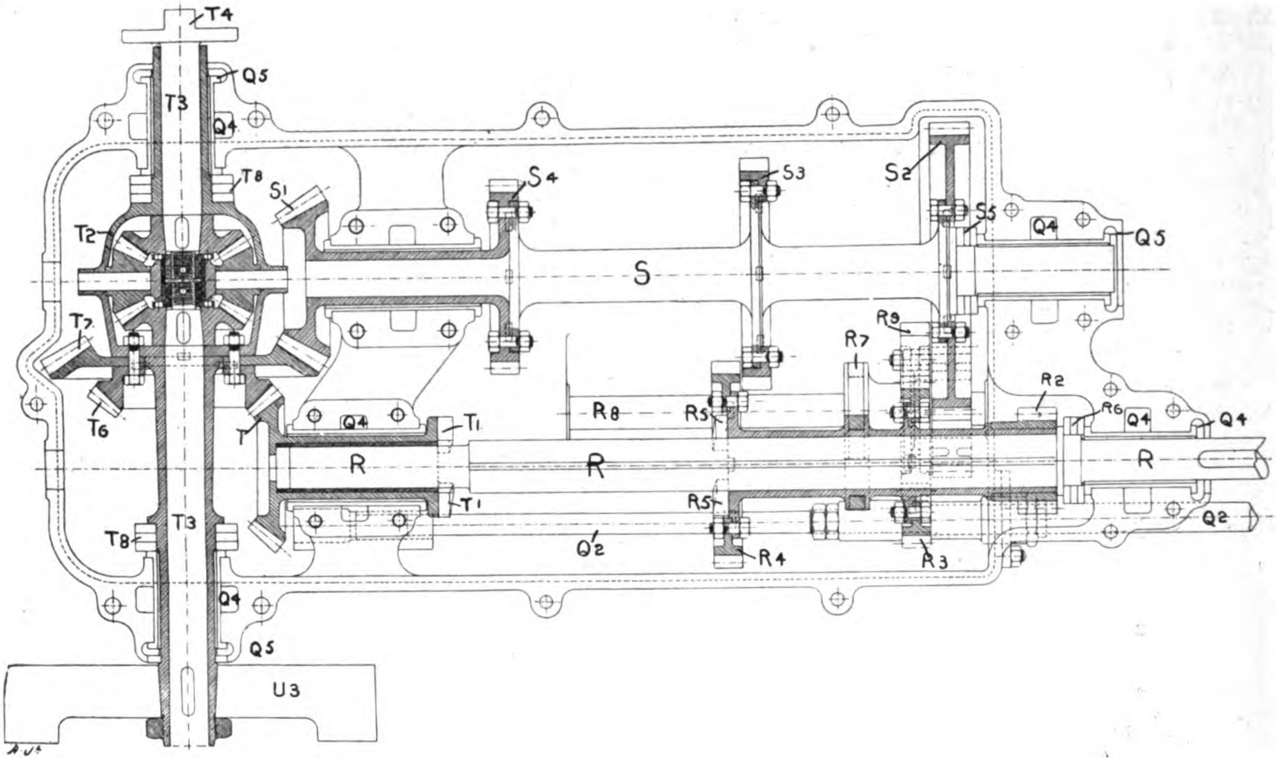


FIG. 16.—Horizontal section showing the arrangement of the Crossley Change-Speed-Gear.

is mounted upon the same shaft, P^1, as the clutch-pedal, P, and a jaw-clutch is arranged between them in such a way that the clutch is withdrawn when the brake is applied. The hand-lever, V, which acts upon both side-brakes simultaneously, is connected with them, through the rocking-shaft, V^1, and the cable, V^2 (already referred to), by the rod, V^6. The clutch is also automatically disengaged when these brakes are applied, and this is provided for by the rod, V^7, which connects the lever, P^3, with the shaft, V^5 (to which the hand-lever, V, is fixed), as seen in Fig. 14.

The construction of the side-brakes, and the manner in which they are fitted to the rear wheels, is shown in Figs. 17 and 18,

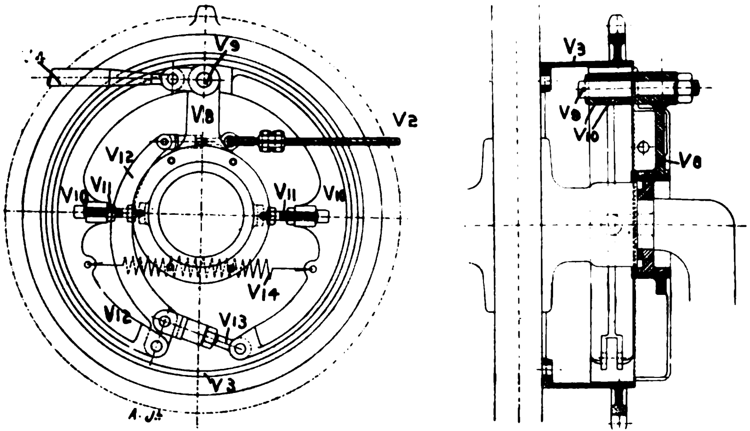


FIG. 18.—Elevation and cross-section of the Crossley Expanding Side Brakes.

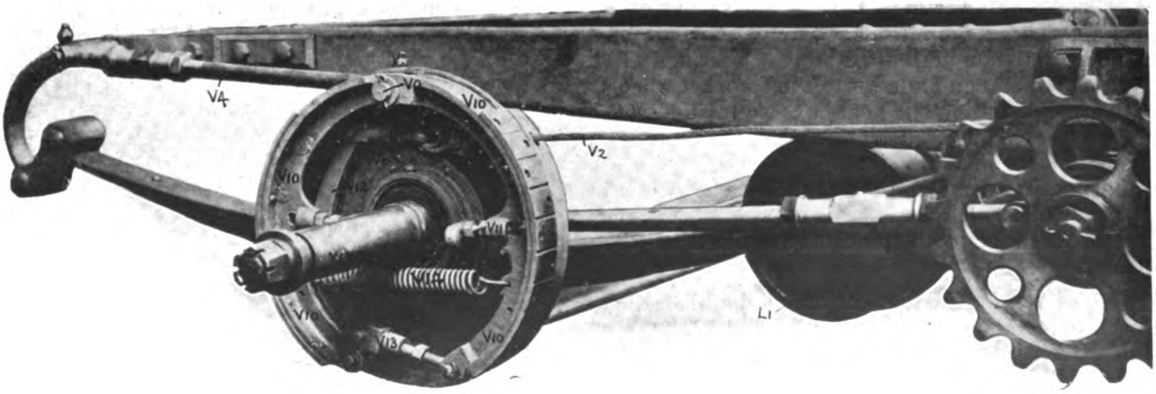


FIG. 17.—View showing the internal construction of the Crossley Expanding Side Brakes.

the former being reproduced from a photograph of the internal mechanism, and the latter giving an elevation and a cross-section respectively. The internal brake surface is formed inside the drums, V^3, on which the teeth of the large chain-wheels are cut. The expanding shoes, V^{10}, are both fulcrumed upon a pin, V^9, which is carried about the stationary axle upon a casting, V^8, and is tied by the hinged radius rod, V^4, to the back of the main frame. The lower ends of these shoes are connected together, and with the lever, V^{12}, in the manner shown in the elevation (Fig. 18), the upper end of this lever being connected with the steel cable, V^2. The shoes, V^{10}, are normally held clear of the drum, V^3, by the tension spring, V^{14}, and they are prevented from moving too far in this direction by the adjustable stops, V^{11}. The necessary adjustment by which wear can be taken up is provided at V^{13}, and an adjustment is also introduced in the radius rod, V^4, to make the necessary compensation when tightening the side chains by the usual radius rods. The adjustment nuts on all these rods are made of yellow metal, so as to prevent them from rusting up.

An unusual feature of the Crossley car is that small lubricators are fitted to all the moving parts, however insignificant and however small the required movement may be. Many of these joints only require a drop of oil very occasionally, and are therefore liable to receive no attention whatever on many vehicles. They are, nevertheless, likely sooner or later to occasion trouble if completely neglected, and they are far less likely to be forgotten or ignored by the owner if oil cups are fitted, as on this vehicle.

THE JUNGNER ALKALINE BATTERY.

OWING largely to Edison's world-wide fame as an inventor of several of the electrical appliances with which the public is most familiar, and to the extensive propaganda carried on in his favour by the general press, the impression has become disseminated that he is the first and only inventor of a satisfactory secondary battery in which an unalterable electrolyte—a solution of caustic alkali—is employed. This is, however, very far from being the truth. We have from time to time during the last year or two alluded to the researches of Herr Jungner of Stockholm, and the different types of batteries which he has devised. Herr Jungner has been investigating the problem of producing a secondary battery using a solution of caustic alkali for several years past, and as a matter of fact he antedates the Edison invention in several important particulars. This is clearly shown by the records of the British Patent Office, and evidence of it may be seen by anyone who will be at the trouble of contrasting the first issue of Edison's nickel battery patent (shortly after acceptance) with the final form which that patent has assumed when amended by order of the Law Officer.

As originally accepted the Edison patent contained very broad claims for the use of oxides of nickel, either mixed or not with flake graphite, as the active material in the positive plates—finely-divided iron, specially prepared, being, as our readers are aware, the active material of the negative plates (*see* AUTOMOTOR JOURNAL, July 15th, 1901, page 493). As since amended, by order of the Law Officer, Edison's patent no longer claims nickel oxide broadly, nor even when mixed with flake graphite, but only when prepared for use by being preliminarily subjected to considerable pressure. And the claims are preceded by a most elaborate "disclaimer," stating that Edison does not claim the use of oxides as depolarisers.

These very extensive alterations in Edison's patent which, of course, enormously affect its commercial value, are the result of an opposition entered by Jungner on the ground of previous patents in this country granted to himself. These patents go back as far as 1895, the date of Jungner's first British application for a patent in which metallic oxides were used as depolarisers in an electrolyte of caustic alkali.

Jungner continued his experiments, and their progress is marked by various British applications, filed nearly every succeeding year, the final outcome of these experiments being the present form of Jungner battery, which was exhibited at the recent Paris Salon, and which has been most favourably reported on by Herr U. Schoop, the well-known German authority and writer on accumulators. Like Edison, Jungner has used in the negative plate not only deposited zinc, but also finely-divided metallic iron reduced electrolytically from the hydrated oxide of iron. One combination which Herr Jungner devised, and which promised very well at first, consisted of finely-divided iron as the active material of the negative plate, oxide of silver being used as the active material of the positive plate. This battery, of course, had the price of the silver oxide to contend with as an initial objection, but it was further found that the silver oxide was slightly soluble in the caustic alkali electrolyte, and tended on prolonged use to be deposited on the negative plate, giving rise to local action and loss of charge on open circuit.

Jungner also apparently antedated Edison in the use of finely-divided cadmium as the active material of the negative plate, but, as in Edison's case, this was abandoned owing to the low electromotive force produced.

In its present form the most recent Jungner battery consists of negative plates in which finely-divided iron or cadmium is the active substance and positive plates in which the active material is oxide of nickel. The British specification in which this battery is described being antedated under the International Convention, is a prior grant to that of Edison's patent.

A comparison of the two batteries is of interest as showing the different lines on which two inventors who have decided to use the same material to attain their object—a mechanical genius and an electro-metallurgical expert—have attempted to solve the problem they have set themselves.

Our readers are sufficiently familiar with Edison's battery to render it unnecessary for us to do more than briefly recapitulate its essential features. It will be remembered that the active material mixed with flake graphite, presumably for increasing the conductivity, is formed into briquettes under great hydraulic pressure, and these briquettes are inserted into little cases or pockets of perforated nickel-plated steel, and inserted one above the other in the spaces in the grid.

Jungner's procedure differs in many respects. Both positive and negative plates are built up on grids of nickel-plated mild steel, of a shape similar to Edison's. The active material of the negative plates is simply inserted into the grid under pressure, and is retained there by thin plates of perforated nickel-plated steel covering the whole surface of the plates, and held in position by vertical rods, the edges of the plates being crimped. The negative active material is usually finely-divided iron, but in some cases—notably in the case of the battery tested by Herr Schoop—finely-divided cadmium is employed.

The apertures of the grid in the positive plates are filled by plates or sheets of metallic nickel, firmly secured in position, the whole plate when finished being enclosed similarly to the negative plate. The rigidity of the whole battery is ensured by the insertion between the plates of corrugated separators of perforated ebonite of the kind frequently used in lead automobile cells.

The conversion of the metallic nickel sheets occupying the apertures or windows of the positives into active material is performed by Jungner by a special process, which has certain analogies with the Planté formation in lead batteries. For however long a period metallic nickel is subjected to electrolytic action as an anode in caustic alkali, it remains unacted upon. This is not the case, however, when a certain proportion of chloride is added to the alkali, and Jungner's process of formation consists of treating the nickel plates as anodes (positives) in a mixed solution of caustic alkali and alkaline chloride. The result of this treatment is to produce on the surface of the nickel a layer of oxy-chloride of nickel at the same time eating into and pitting the surface of the metal considerably, thereby greatly increasing the extent of the active surface. The nickel plates are then transferred to a bath of pure caustic alkali, and again subjected to the action of a charging current for a considerable length of time. This process has the effect of converting the whole of the oxy-chloride layer into an adherent layer of nickel peroxide, and the active nickel plates thus formed are inserted into the apertures of the positive grid and secured there.

This method of constructing the positive plates has not, however, been used in the most recent Jungner batteries. In them a hydrated oxide of nickel mixed with flaked graphite is compressed by powerful hydraulic presses into the apertures of the positive grid and subsequently formed, the active material being retained in place by the use of the perforated metal sheets above described.

The positive and negative plates are assembled into sections by screwing the lugs of the plates to two horizontal conducting bars by means of nickel-plated iron nuts, the whole battery being assembled in the ordinary way. Caustic alkali solution is used as the electrolyte, and the containing vessel may be either ebonite or thin nickel-plated steel. Extensive works have been laid down at Norrköping, in Sweden, for the manufacture of Jungner accumulators, and Herr Schoop, who spent some time there, reports that very satisfactory tests have been made with the Jungner battery, both in the laboratory and for running cars on the road. If accounts are to be believed the output of the Jungner battery is equal to that of the Edison battery, 24 watt-hours at low rates of discharge, and 20 watt-hours at high rates, having been obtained per kilogram of cell.

Herr Schoop's researches have brought to light a very interesting fact. The ordinary lead cell warms up to a certain extent on charging, and loses heat on discharge if the rate of discharge is low. The opposite is the case with the Jungner battery (and presumably with the Edison battery also). At moderate currents it absorbs heat and becomes *cooler* on charge, getting warmer on discharge. In other words, the compounds formed on charge are *endothermic*. The significance of this fact is not at present fully apparent.

The perfectation and commercial development of the Jungner battery are of high interest to all interested in the future of the electromobile. Its invention and practical exploitation, and above all the recognition of Jungner's prior claims by the British Patent Office, render it unlikely that any advantages which the alkaline battery may be found to possess for the propulsion of electromobiles will prove so completely a monopoly as was at one time anticipated. It is, of course, far too early to form even a guess as to whether the Jungner or the Edison battery will prove commercially the superior article, but the existence of the two side by side provide the materials for healthy competition, while Jungner's method of constructing his positive plates certainly suggests that those plates are likely to possess some of the advantages of the Planté-formed positive plates of lead batteries, while the figures we have quoted in regard to output show that these advantages are not obtained at the cost of increased weight.

It is interesting to learn that M. Krieger, the well-known electromobile constructor of Paris, claimed at a recent discussion on the Edison battery that he himself had experimented and obtained a certain amount of success with nickel oxide positives as long ago as the year 1897. In M. Krieger's experiments, the nickel was plated in a loose condition on to a support of metallic iron not previously nickel plated, and the loose deposit of metallic nickel was formed by a kind of Planté formation process (which M. Krieger did not describe) into nickel peroxide. He states that the facts obtained with nickel plated loosely on to an iron support are better than when nickel is plated on to a nickel support, there being some kind of local or differential action between the two metals which facilitates the formation of the peroxide.

It is also of interest to record M. Krieger's view, that the reason the Edison, and very probably the Jungner battery, do not retain their charge on open circuit better than they do is that the highest nickel oxides act as a sort of acid radical and form compounds which might be described as nickelates of potash with the electrolyte, compounds the nature of which is assumed to be somewhat similar to that of silicates.

No Jungner batteries have yet arrived in this country, we are therefore compelled to rely for data as to the capacity of the cells now manufactured on the reports of Herr Schoop, to which we have already referred. Some batteries are on their way from Sweden, and we hope to be in a position at an early date to supply our readers with illustrations of them and better authenticated statements as to what the capacity and general behaviour of these batteries are.

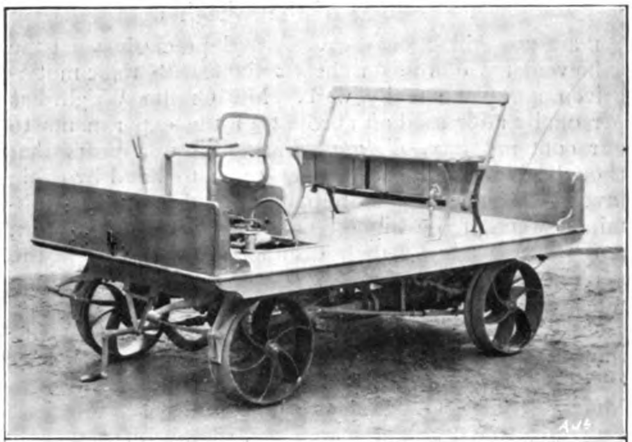
* * *

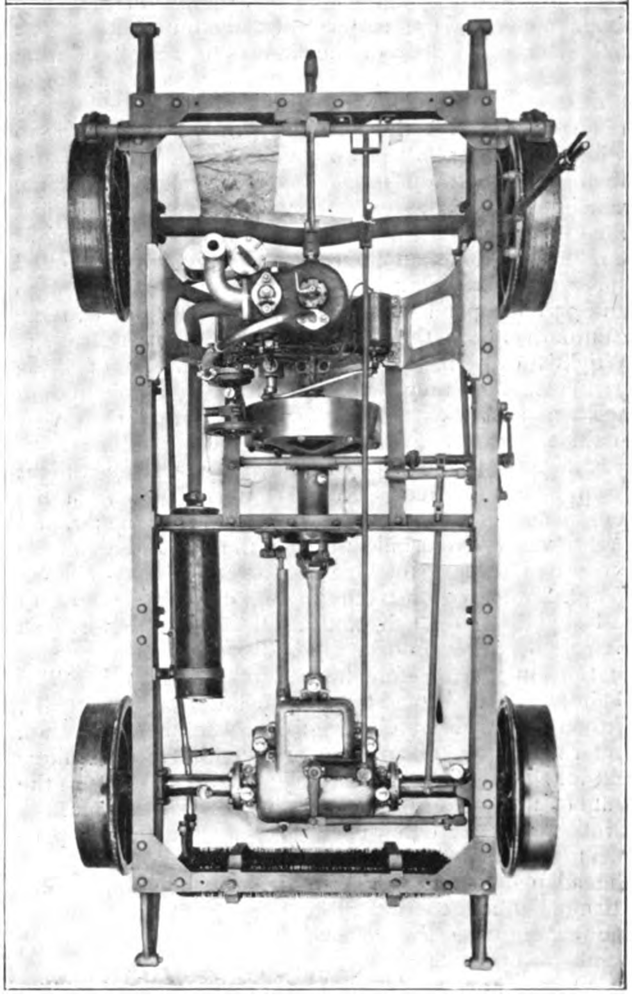
M. Vittorio Sambolino, of Turin, has a vast project in hand for organising a regular automobile service in Italy, and in the adjoining French departments and part of Switzerland. He is seeking powers from the authorities for running motor cars on no less than 250 different routes. If authorised, he proposes to fix a uniform fare of 6 centimes per kilom.

A PETROL INSPECTION TROLLEY FOR A SOUTH AFRICAN RAILWAY.

One of our illustrations shows a complete inspection trolley which has recently been built by the Simms Manufacturing Company at Kilburn, to the order of Messrs. Sir Douglas Fox and Partners for the Rhodesia Railway Company. The other illustration is a view of the chassis from above, and very clearly shows the form of construction and the arrangement of the various parts which has been adopted. The main-frame is of armoured wood, and it is mounted above the axles on semi-elliptic side springs. The wheels are 18 inches in diameter, and are made of cast steel; those in front run loose on the ends of the stationary front axle, and those at the back are fixed to a live-rear-axle. The wheel base is 15 ft., and the gauge 3 ft. 6 in.

The power is supplied by a 6-h.p. single-cylinder engine, which has a normal speed of 1,000 revs. per min., and a maximum speed of 1,500 revs. per min.; magneto ignition, an automatic carburettor, and an automatic lubricator are used in conjunction with it. An ordinary cone clutch is mounted immediately behind the engine, and the change-speed-gear is fitted about the back axle, the power being transmitted from the clutch to the gear through a propeller shaft. The first-motion shaft in the gear-box is bevel driven, and lies parallel with the axle. It has two facing bevel wheels fitted on it, either of which can be brought into mesh with the wheel on the shaft driving it, thus providing a reversing gear. The first-motion shaft also carries a pair of spur-wheels with which corresponding sliding wheels on the axle can be brought into mesh, giving two speeds in much the usual way. When the engine is running at 1,000 revs. per min., the trolley is driven at either 10 or 30 miles per hour. The hand levers for operating the change-speed-gear and the reverse-gear are fitted near the driver's seat. A screw-brake, operated by a hand-wheel, is arranged to act upon the two front wheels, and a band-brake, actuated by a foot pedal, is fitted to the rear axle. The body has a floor space of 38 sq. ft., and a seat for three people is fixed behind the driver's seat. The driver's seat is so hinged that it can be turned over to enable him to face in whichever direction the car may be travelling; the foot pedal is arranged in duplicate, so that he can operate the foot-brake from either side of the brake wheel; the hand-levers are so placed that they are equally convenient from either position. The cooling water is circulated through a radiator in front by a pump driven from the flywheel, and a water tank having a capacity of 5 gals. is connected with the system; the petrol tank also has a capacity of 5 gals.





Awards in connection with the Brussels Salon are announced as follows:—For the best Stands, 1st prize, Bayard-Clement. Chassis—*1st Category*, 1st prize, Fabrique Nat. d'Armes de Herstal; 2nd, Rochet Schneider; 3rd, Pipe. *2nd Category*, 1st and 2nd prize, Fab. Nat. d'Armes de Herstal; 3rd, Pipe. *3rd Category*, 1st, Fab. Nat. d'Armes de Herstal; 2nd, Van den Plass; 3rd, Germain. *4th Category*, 1st and 2nd prize, G. Dutern. *5th Category*, 1st, Mallevez and Michotte; 2nd, Bovy; 3rd, Oldsmobile.

By way of emphasising the decision of the Huntingdonshire County Council last week not to specify any roads or places as dangerous through which motor cars must be driven at a reduced speed, the chairman, the Earl of Sandwich, remarked that it would be necessary to include every road and corner as dangerous, as almost every thoroughfare and turning unless a motorist exercised care and vigilance, would come under this category.

PROGRESS IN AERONAUTICS.

The Flight of the Wrights.

We are now able to say exactly and precisely what the achievements of the Wright Brothers with their motor-driven aeroplane really were. Mr. Orville Wright has personally addressed an account of the experiments to our contemporary, *L'Auto.* From this it appears that though the first accounts that came to hand by cable involved some exaggeration, the results actually obtained were of the highest possible value and interest, and though the actual distance traversed by the aeroplane was vastly less than the original three miles announced, the shortness of the flight was due merely to a very trifling accident. On the other hand the force of the wind against which the aeroplane successfully flew was greater than at first stated. At the Meteorological Observatory of Kittyhawk the wind-gauge registered 27 miles an hour, while with the hand anemometer on the surface of the ground it was 22 miles during the first of the flights and 20 miles during the last. The aeroplane was started upon a rail arranged 8 metres above the ground, and after running along this rail some 40 feet the machine slowly rose from it to a height of 8 or 10 feet above the level of the rail and then proceeded on its course. The new aeroplane, which has been christened the "Flyer," advanced against the distinctly high wind with which it was contending at a rate of 10 miles an hour over the ground, the actual speed through the air being in consequence between 30 and 35 miles per hour. Bravery tempered by extreme caution has been the characteristic of all the Brothers Wright's experiments, and on the occasion of these particular trials they determined to keep the chances of accident as low as possible by manœuvring at a very slight elevation above the surface of the sand-hills. It was this very caution that prevented a much longer flight from being effected. On the fourth flight, when the aeroplane had already been 59 seconds in the air, and had travelled half a mile through the air, and therefore an actual distance of 852 feet over the ground, Mr. Wright, who was manœuvring it, dipped the forward tail slightly too much, and as the machine was just passing over the top of a sand-hill it struck the surface of the eminence before he had time to right it. The flight was thus brought to a conclusion unexpectedly, without the slightest damage to the machine, and could, as far as can be judged, have been continued indefinitely but for this very slight error of judgment. Owing to the state of the weather and the violence of the wind, the Brothers Wright determined to postpone their experiments for the present, but sufficient was done to prove the adaptability of the Wright aeroplane for motor attachment, and to render it practically certain that when the experiments are renewed even more remarkable results will be obtained.

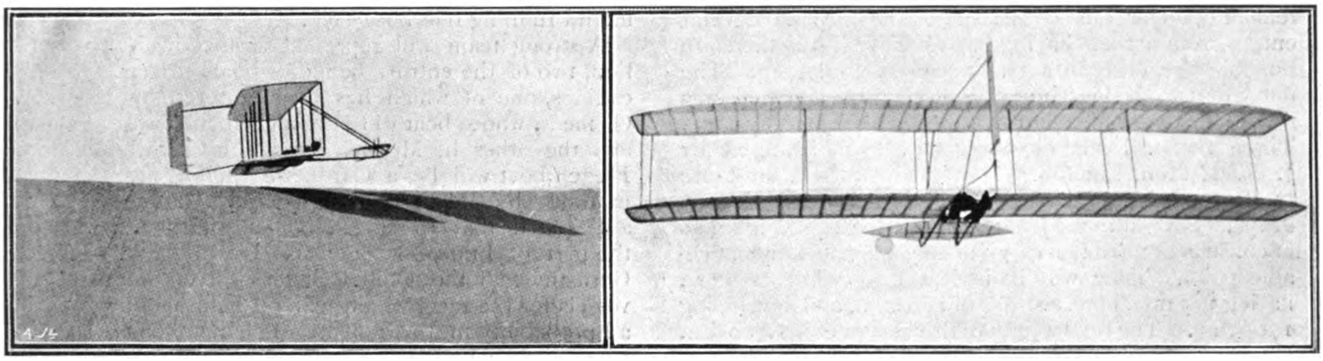
We reproduce a picture of the latest type of gliding machine to which the Wrights have applied motor propulsion. Their latest and most satisfactory experiments with this aeroplane without motor attachment were referred to by us in the Journal for Oct. 3, 1903. It will be seen that this machine has two tails, one in front, by which the rising and falling of the aeroplane is controlled, and one in the rear (the rear rudder), by which its movements, right and left, are effected. The machine with which the recent experiments were carried out is, we understand, exactly similar in appearance to the one we reproduce. But while this machine was 32 ft. from tip to tip, and only 5 ft. from front to rear, the motor-equipped aeroplane is 40 ft. from tip to tip of the wings, and 20 ft. from front to back, the total supporting surface being 1,020 square feet owing to the curvature, for as in all the Wright machines the surfaces are slightly curved upwards instead of being absolutely flat, this giving a slight forward component when gliding against a wind, and also increasing the lifting capacity of the machine. The "Flyer" is driven by two propellers, one mounted on the rear of each aeroplane, just where the plane of the vertical tail intersects them. They are driven by a 12-h.p. internal combustion motor, designed by the Wright Brothers themselves, weighing complete 152 lbs. The motor which is on the ordinary Otto cycle has four cylinders, the stroke and bore being 4 inches. The total weight of the machine, including motor and aeronaut, is a little over 745 lbs., and the whole is so solidly and firmly built that it was not in the slightest degree injured by coming to the ground with somewhat unintended rapidity.

The Intentions of M. Archdeacon.

M. Archdeacon, who, as we have already chronicled, has determined to follow in the steps of the Wright Brothers, and reproduce over the soil of France the flights which have made North Carolina so celebrated, arranged with Col. Renard to construct for him an aeroplane on the lines, we are told, of M. Chanute's machine. The framework is of ash, the fabric stretched over the ash rods being of French silk, and the whole weighs 30 kilogs. The machine has been already almost completed under the supervision of M. Dargent, Col. Renard's assistant at Chalais-Meudon. M. Archdeacon anticipates being able to commence experiments with it about the middle of February at Berck, the spot on the Channel coast which we have already referred to. He will be assisted in his experiments by M. Robart, who has himself designed several flying machines, and is greatly interested in aeronautics.

It is a little difficult to understand why M. Archdeacon should have adopted the Chanute model of aeroplane. The model adopted by the Brothers Wright is recognised by M. Chanute himself as a great improvement on his own machine. In the Chanute machine an aeronaut hung on underneath and endeavoured to control the movements of the machine, partly by manipulating the tail and partly by varying his position, and, as a consequence, the centre of gravity of the whole. The great departure made by the Brothers Wright is in assuming the horizontal position for the aeronaut, which diminishes the resistance to the air, and manipulating the machine entirely by movements of the front and rear tails. This, as we have explained on previous occasions, enables the machine to cope with unexpected variations in the strength of the wind in a way (under the hands of a skilful manipulator) which cannot be approached in the case of a machine in which the centre of gravity of the whole is varied. As the modifications of design adopted by the Brothers Wright have been unquestionably effective in assisting in the great progress they have made, one would certainly think that the wiser course for another experimenter would be to follow in the same direction, though, of course, the Wright aeroplane may be somewhat like the bow of Ulysses—a machine that not everybody can tackle. Not everybody, at any rate, is likely to be anxious to assume the horizontal position at the first start. But there can be little doubt that the Wright machine is less dangerous to experiment with than the earlier type designed by M. Chanute.

M. Archdeacon's numerous friends and admirers very naturally are anxious to witness his first attempt at learning to fly. We are reminded of the cynic who observed that "the misfortunes of our friends are the source of our sincerest satisfactions." So M. Archdeacon's friends have persuaded him, if possible, to carry out his experiments in the near neighbourhood of Paris, and M. Archdeacon appears disposed to yield to their solicitations. At any rate, he has declared that he intends experimenting near the capital if he can find a suitable site for the purpose. We doubt his wisdom in this. *Nemo repente turpis*—no one can learn to fly all at once, and the first attempts of any experimenter are likely to be subversive of his personal dignity, to say the least of it. This is probably one of the many reasons why the Wright Brothers selected the out-of-the-way Carolina coast for their first experiments, though as we shall point out presently, and have pointed out before, there are other reasons.



Side view, in full flight, with the aeronaut lying horizontally.

Rear view, in full flight.

The Wrights' Aeroplane.

M. Archdeacon, as we have said, is willing to commence his experiments near Paris if a suitable site can be discovered. It is not very likely that it will be. A specification of what M. Archdeacon requires has been published by our contemporary, *Le Velo*. The ideal is a conical hill, of as large dimensions as can be found, presumably with a soft surface for falling on (sand preferred for choice), with an angle as near as possible to 20 degrees with the horizon. It must afford a straight run of at least 60 metres, and the longer the better. The hill must be conical, so that the experimenter, starting at the top, can take advantage of the wind, no matter what direction it blows from, and sail down on his aeroplane against it in any direction; for these experiments, in which gravity is relied upon as the motive force, have on all occasions to be conducted against the wind. Anyone who is the happy possessor, therefore, of a conical hill with an angle of 20 degrees to the horizon consisting of sand or other soft material, or covered therewith to a reasonable depth, with no trees, rocks, walls, houses, police officers, or other obstacles, and is willing to place the same at the disposal of M. Archdeacon, should communicate with the office of *Le Velo*. If a structure, preferably on private ground, is at hand, in which the aeroplane can conveniently be housed when not in use, so much the better. Needless to say it is unlikely that anyone will be found to be the possessor of such an eligible property in the neighbourhood of Paris, and we, therefore, feel that M. Archdeacon's numerous friends are likely to be disappointed and that they will have to travel to the Channel coast if they desire to enjoy the spectacle of M. Archdeacon's first attempts in aviation.

We think M. Archdeacon will be wise and prudent to prefer the sea coast. The most important factor in experiments of this kind, as we have said before, but, on account of its great importance, have no hesitation in saying again, is a fairly reliable and steady breeze, which can be relied upon to blow for considerable periods at something like the same strength, and from, as far as possible, the same direction. It was the prevalence of winds of this kind blowing off the Atlantic that caused the Wrights in the first instance to select the coast of North Carolina. The Channel breezes are notoriously variable, and if M. Archdeacon could find suitable sand-dunes on the Atlantic coast, say, of Brittany, he would probably be able to command more regular breezes. An additional reason why a breeze blowing off the sea is preferable to anything else is because a wind is a very different thing in actual fact to what most people imagine it to be. The ordinary man in the street looks upon a wind as a current of air varying from time to time, no doubt, in force and direction, but as being, while blowing from any particular point, a steady stream, in which the particles of air all flow more or less parallel to one another. Though this may be true of wind high up above the surface of the earth, no idea of the winds that actually prevail near the surface could be more utterly incorrect. Wind is not a steady stream, but, as Mr. Chanute has ably pointed out, a "series of whirling billows of air." It is these that render the manipulation of an aeroplane so difficult and are so liable to wreck it at any moment. Now the billows are much more equable, and the wind approaches in character much more nearly to what the ordinary man imagines it to be when it is blowing fresh off the sea. The more land it blows over the more irregular do the billows which constitute it become. This is an additional reason for selecting the spot at which off-sea breezes are available. For obvious reasons, the off-sea breezes on the Brittany coast are more suitable than those on the Channel coast, as, when not too violent, both their direction and, in a great degree, their speed, are more equable. Aeroplane experimentation requires not only great pluck, but persistency. Even on the

Carolina coast, the ideal spot for such work, the occasions when the Wrights could actually attempt flight were far from frequent. Exactly the right force of wind must prevail, and it must come, practically, from some particular point, for the directions in which the declivities of even the most ideal hill extend are distinctly limited. Then the aeroplane has to be balanced by the hands of assistants till it lifts before a glide can be commenced, and if there are chopping and changing winds, the few propitious moments are almost certain to be squandered, and a start made too soon or too late. No, we do not think M. Archdeacon is likely to gain any really satisfactory experience in the neighbourhood of Paris, and is more likely to do so on the Atlantic coast than on the Channel. Some of these observations have been made by us before, but the matter is so serious, and M. Archdeacon is risking so much, that we have ventured to repeat them, for it must be borne in mind that Mr. Chanute, than whom there is no greater authority on the subject, admits there is a danger in these experiments, even under the equable conditions obtaining in North Carolina. He considers that to attempt the same kind of thing under the unsatisfactory, varying, and often squally, conditions prevailing in Europe would be so dangerous that no one ought to attempt it.

MARINE MOTORING.

Monday last was the final date fixed for entering boats to compete for the British International Cup, subject to there being no challenge from abroad. In the event, however, of a foreign challenge being received by February 1st, it was announced that the lists would then remain open for some considerable time further. Several entries from abroad having been received, it is therefore possible the entry lists may not close until June. The entry of two Napier boats by S. F. Edge, Limited, was recorded some time ago (in our issue of January 2nd). Three 40 ft. launches have now been entered by J. E. Hutton, Limited. The hulls of these craft are built of wood, and have been designed by Mr. Linton Hope. Several novel features are introduced, lightness of construction (ribbon carvel) being a particularly noticeable point. They will be fitted with 6-cylinder motors, having 175 mm. bore, a stroke of 160 mm., and developing 170-b.h.p. The total weight of these engines is 1,500 lbs., and they develop their full power of 170-b.h.p. at 1,200 revs. per min., giving 142-b.h.p. at 1,000 revs. They are provided with a special patent carburettor, which is actuated directly by the governor controlling the speed of the engine. It can also be controlled by an ordinary hand accelerator. In addition to the Napier and Hutton boats, competing vessels have also been entered by Messrs. Thornycroft and Lord Howard de Walden, who intend running one boat each.

A strong team will represent France in the competition, two of the entries being for boats driven by petrol engines, one of which has been entered by Mons. A. Clement, whose boat will have a Clement-Bayard engine, and the other by Messrs. Pitre and Co., while a third French boat will be a Gardner-Serpollet steam launch, entered by Messrs. Legru and Gardner. It is anticipated that there will be still further entries on the part of France, while it is also probable that both Germany and the United States will enter competing vessels for the race, which will be held on July 30th, in all probability in the Solent. The number of English competitors who have entered will necessitate an Eliminating Race being held in order to select the three boats which will represent England in the race itself.

Further Development in Motor Volunteering.

The Motor Volunteer movement continues to grow in importance, and the energetic commander of the body, Lieut.-Col. Mark Mayhew, has now made an application which, if granted, will have the effect of making all the Motor Volunteers fully combatant members of the Service. He asks that rifles should be supplied for their use, as they are at present unprovided with any means of defence. Proposals are also being made for giving the Motor Volunteers regular military training. It will, of course, hardly be possible for them all to come together and train as one corps, since the majority of them live so widely separated from one another. But it is proposed that they should join local corps in the districts in which they reside, and so obtain a certain amount of military training, becoming locally "efficient" members of the Service. At the same time, they can assist the local corps to which they belong by acting as orderlies as well as ordinary combatants. A special corps for training in scouting and work of that kind is also proposed for motor cyclists. It is to be trusted that these ideas will be carried out practically at an early date, as they are calculated very materially to increase the utility of the Motor Volunteer Corps for military purposes.

A number of sensational statements have been finding currency in the daily papers about the invention of improvements in the steam engine, which will effect an economy of from 25 to 80c per cent. The invention is credited to a Mr. Thornley, of Burton-on-Trent, and, as far as can be understood from the accounts that have hitherto appeared, would seem to consist in a special valve, by which the steam can be admitted behind the pistons more instantaneously at the commencement of each stroke than has been possible with existing valves. The extravagant claims made renders it difficult for us to avoid a certain amount of scepticism about the new motor, but we await intelligible information concerning it.

As an expert in brow-beating Counsel, commend us to Judge Smyly, of the Shoreditch County Court. Counsel for a defendant—of course, in a motor car case—submitted that it was the duty of every horse owner to train his horse to ignore noise. Witness replied he did not consider it a duty. On Counsel submitting that if his client sold his Honour a horse—Judge Smyly interrupted with: "He hasn't sold me a horse." Counsel: "I was suggesting." The Judge: "Well, don't suggest. Keep to the facts. We haven't time in County Courts to waste on suggestions"—nor, apparently, on fair play, either.

THE LEGAL ASPECTS OF THE MOTOR CAR ACT* (*Concluded*).

By Earl Russell.

Observations.—The Act has been so hastily thrown into its present shape by innumerable amendments at the extreme end of a session, that it is not surprising to find it full of anomalies, inconsistencies, and inaccuracies.

Among the anomalies may be noticed the two kinds of local authorities, of which one registers and licences, while the other recommends roads for the 10-miles limit, and has the duty of erecting notice or caution boards. Another is the curious difference already noted between the evidence required to convict for exceeding the speed limit of 20 miles, but not required for the 10-miles limit. The "Good Samaritan" Clause (Sec. 6) was proposed by Lord Camperdown, and most rashly accepted by Lord Balfour of Burleigh, and gives rise to a host of conundrums, none of them admitting of an answer. What is an accident? When is it owing to the presence of a motor car on the road? Where is the motor car to stop, and how long? If a lady falls off her bicycle through sheer terror, is that an accident? If an unattended horse and cart runs away, is it in charge of any person? If three motor cars pass, and one horse runs away with its rider, which car is to stop? If a horse bolts for half a mile with a carriage and then turns it over, is the motor car to stop where it starts bolting, or where it finishes? These questions must not be regarded as frivolous, for they are absolutely germane to the actual words of this amazing section of this most amazing Act, and any one of them may be seriously argued before the Divisional Court on appeal from a conviction. The clause has probably become absurd through being intended to hit everybody, but I suggest that the following form of words would have been much more effective:—"If any person driving a motor car who has knowingly been the cause of an accident drives away with intent to avoid identification or to escape civil or criminal liability, he shall be guilty of an offence under this Act." As the section now stands, if you only knock your person senseless, or even fluster him sufficiently, so that he omits to ask your name and address, you can drive on with perfect safety after waiting a reasonable time.

I now come to some curious legal conundrums.

(1) Sec. 9 professes to make it an offence to exceed 10 miles per hour "within any limits or place referred to in regulations made by the Local Government with a view to the safety of the public on the application of the local authority," and gives power to the Local Government Board to "revoke or alter" such regulations. But neither in this section, nor anywhere else in the Act, is power given to the Local Government Board to *make* such regulations in the first instance, unless, indeed, the very loose words of Sec. 6 (2) of the principal Act are considered to give this power. It seems that such regulations then would be *ultra vires*.

It may be argued that the power must be necessarily inferred, but I am inclined to think the more constitutional doctrine is that when Parliament delegates its sovereign law-making power, the delegation must be express, and that nothing can be read into the words of the statute. I imagine that there must be decisions to this effect on record in many cases of by-laws.

It is worth noting that the Local Government Board cannot act on its own initiative, but must be moved by the local authority. Once the application has been made, however, the regulations may be revoked or altered without the consent of the local authority.

(2) The Act says that "a mark" is to be fixed to the car, and this can only mean one mark. All the mark is to do is to indicate "the registered number of the car, and the Council with which the car is registered." The Local Government Board has power to make regulations as to how this mark "shall be fixed on the car, or on a vehicle drawn by the car, or on both." Under a later section they have power to make regulations as to its "size, shape, and character," mode of fixing and illumination, and the keeping of the register. It is true that in this section (7) the words "identifying marks" are used, but they relate to "motor cars" immediately preceding, and also in the plural.

The Local Government Board endeavour to get over the difficulty by saying in Article 7 of their Regulations, that the mark "shall consist of two plates." No person and no Government Department has the power to compel me to disfigure my private property, save in accordance with express statutory provision, which in this case is lacking. Article 7 is, therefore, in my opinion, *ultra vires*.

(3) It may, perhaps, not be of importance whether the regulations are *ultra vires* or not, since there appear to be no penalties for offences in connection with identifying marks.

Section 2 (4) creates the offence and fixes the penalties, but the vehicle to which they apply is described as "a car" and "the car," expressions to which it is impossible to attach any legal meaning. Section 20 gives us the interpretation and meaning of the expression, "motor car," but nowhere can we find any meaning for "car" by itself. As penal provisions and penal statutes have to be construed strictly, and in favour of the defendant where there is any doubt, I should look forward with interest to the result of a prosecution under this section.

(4) There are some strange confusions as to the places where offences can be committed. Section 20 extends the provisions both of the new Act and of the principal Act to "a roadway to which the public are granted access," as well as to a public highway. I am not aware of any Parliamentary or legal definition of "a roadway to which the public are granted access." Has the access to be continuous? Must it imply a right on the part of the public, or a favour on the part of the landowner? Has the public to be admitted free, or on payment? I am aware of no possible authority to answer these questions. I do not know whether the roads round about Southampton, where one pays tolls, are public highways or not; it is certain that the approaches to railway stations are not. But they are both alike in this—that any member of the public can obtain access to them by payment. If a landowner habitually allows the roads in his park to be used, but by closing his gates occasionally prevents the establishment of a right-of-way, are they within the definition or not? If so, speed trials at Welbeck will be out of the question, and it seems to me that even the race track at Purley will be subject to the provisions of the new Act if any member of the public is granted access to it on payment.

The offence of employing an unlicensed person to drive a car (Section 3 (1)) appears from the Act to be complete without a roadway at all, and might be committed in the four walls of a garage.

The L.G.B. Regulations.—There is, I think, some little doubt whether Article 12 of the regulations dealing with the general identification mark of a manufacturer or dealer does not go beyond the powers of the Local Government Board, which appear by the last words of Section 2, Sub-section 4, proviso (*b*) to be limited to the method of fixing the mark upon the car. Possibly this may interest the trade, as I think it would be a good defence to any prosecution for not keeping the record which Article 12 seeks to impose upon manufacturers.

Earl Russell then dealt with some points in the second *draft* regulations of the Local Government Board, which are now being revised, and upon which we commented recently in our columns.

In conclusion, Earl Russell, touching on the attitude which he thought automobilists should adopt, said that conclusions ought to be tried as test cases in the various legal points he had raised. He pointed out that for almost any trumpery offence a couple of J.P's, sitting in Petty Session, had the power to disqualify a man from obtaining a licence to drive a car for the next ten years. He hoped appeals would be frequent, as it gave trouble to the county and reduced the unjust profits made out of automobilists. He advocated good conduct on the road and the giving of drives to persons in authority or of local importance, but recommended aggressive action in elections of County Councillors or Members of Parliament who were in favour of continuing the present unfair discrimination against motor cars. Action of this sort should be effectively and officially organised.

RAILWAYS AND THE MOTOR PROBLEM.*

By Mr. George Montagu, M.P.

Mr. Montagu, in opening his paper, said that his object was to point out what had already been done by the railway companies and what was being contemplated by some of them in the near future in relation to the motor question. His remarks were mainly confined to the passenger aspect of the question, little having, so far, been done by the railway companies in the direction of the carriage of goods by motor. Mr. Montagu then referred to the system which is now creeping in of the railway companies employing motor coaches running upon rails. He thought that this had a great bearing upon the motor problem, because it was a step in the right direction, inasmuch as the "car" principle was for the first time acknowledged as a solution of railway transit, and the main object, he thought, that automobilists had in view was to get the principles of the self-propelled vehicle acknowledged by the public. What was wanted was to get rid of the idea that there must be, of necessity, a separation of power from the load drawn, horse from carriage, locomotive from train, as the case may be. He then dealt, in detail, with Mr. Behr's high speed mono-rail principle, pointing out the enormous advantages which, by its adoption, must accrue to our leading railway systems and at the same time the increased facilities it would afford to the travelling public. Mr. Montagu next described the efforts which had been made by different companies to work short branch lines by means of motor railway coaches and trailers, and pointed out that Mr. Drummond of the London and South Western Railway was the first to have one of his designs actually running between Fratton and Southsea last year. Mr. Drummond's figures for the cost of running were 2·3*d.* per mile as against probably something like 8*d.* to 1*s.* in the case of the ordinary engine and coaches, while the coal consumption was 6·5 lbs. per mile against, probably, 20 lbs. or more under the ordinary system. The first coach was designed with a vertical boiler on account of cheapness, and the short distance of the journey. Under the new scheme on the light railway from Basingstoke to Alton, where longer distances will be traversed, a horizontal boiler is to be the standard pattern. These cars will be able to travel a distance of 60 miles without taking in water, and carry sufficient coal for the day's work, and attain a speed of 30 m.p.h. The Great Western motor coaches are designed for special work, having in the Stroud Valley to contend with gradients of 1 in 75 and 1 in 100. These coaches in view of their being able to stop at level crossings have proved enormously beneficial to the local population in the district. The experiments by the Taff Vale Railway in the same direction, between Cardiff, Penarth, and Cadoxton, a distance of 9½ miles, was also referred to. Dealing with the experiments on the North-Eastern Railway Mr. Montagu said it was proposed to run petrol cars between East and West Hartlepool. To overcome the difficulty of starting the coaches and changing gear a method of a petrol engine driving a dynamo, which in turn drove motors on each of the four axles of the two bogies, has been adopted, this being similar to the system employed on the Fischer omnibus. The Caledonian Railway, he said, were also experimenting on cars similar to those of the North-Eastern, but these were driven by petrol engines direct. Should these petrol cars prove successful there was no doubt, he said, that they would be adopted altogether in the future, superseding the steam cars. He could not say whether petrol cars could be designed of sufficient power to be able to take trailers behind them, but it seemed to him that the governing principle ought to be to get rid of the idea of the train altogether, and not to fall back into the policy of using trailers. Economy must ensue from each motor-coach being of sufficient power for its own propulsion, and that alone. By adding trailers the most important point was lost, viz., rapid acceleration and retardation, which enabled the whole capacity of the railway to be enormously increased. The attitude generally of many railway companies to the motor problem was one of waiting and watching the experiments of others, the main experiments being carried on by the companies already mentioned, and the Caledonian Railway. The London and South-Western were building further motor coaches, and were also inquiring into the question of the motor car as a feeder for the railway. The Midland contemplated experiments with motors, and the Great Eastern Railway were seeking powers this Session for the running of motor cars. The experiments of the Caledonian Railway with petrol motor-coaches Mr. Montagu referred to at some length, and gave a few particulars of the attempt by Lord Leitrim to assist the development of the beautiful country in Donegal in the north of Ireland by regularly running motors in connection with the train services. Lord Leitrim had had no trouble at all with them, and they had run continually from July to October in connection with the trains with the exception of one day when one omnibus was running out of three. After referring to the motor services inaugurated during the past year by the Great Western Railway in Cornwall and Devonshire, he said that the present 20-h.p. vehicles holding 20 passengers were to be improved upon, and some double-decked cars seating 34 put on the road in addition. The Great Western contemplated having a sub-garage at Plymouth, the main workshop being at Penzance, where a large factory had been bought and turned into a garage with room for 30 cars. Of the 30 cars the company had ordered, 18 were to be of 20-h.p. and 12 of 16-h.p. Another service Mr. Montagu said was in contemplation in Wiltshire, between Calne and Marlborough, where there was considerable traffic in farm produce and light goods. Before closing his paper he mentioned the "Caillet" portable mono-railway, which had been successfully tried in South Africa and various parts of the world for carrying farm produce and light goods. It had many advantages over the ordinary bi-rail light railway as the single rail could be laid over very rough country and up extremely steep gradients. The cars carrying the produce had a very low centre of gravity, and hitherto had been drawn by horses. It was now proposed to substitute the motor car for hauling. The system might be adopted in developing agricultural districts with great advantage.

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* Extract from a Paper read at the Automobile Club on January 21st.

* Extract from a Paper read at the Automobile Club on January 28th.

In conclusion Mr. Montagu said that automobilists might congratulate themselves and the railway companies that within the last year a very great stride had been made in the application of the motor to the uses of the railways. Every day it was being shown, even in the experimental stage, that economy resulted from the adoption of the motor. It would, he believed, go far to cure not only social evils, such as the overcrowding in the great towns, but also those which were of no less importance, the difficulties of railway transit, which were so intimately bound up in them.

DISCUSSION ON THE EDISON ACCUMULATOR.

AT a meeting of the Institution of Electrical Engineers held on Thursday, the 28th ult., the postponed discussion on Mr. Hibbert's Paper on "The Edison Accumulator for Automobiles," reference to which was made in our issue of December 5th last (an illustrated article on the same subject also appearing in the issue for January 2nd), was opened by Dr. J. A. Fleming, who said that his own experiments on the Edison Cell, carried out in the University College Laboratory, confirmed in the main Mr. Hibbert's results.

Both Dr. Fleming and Mr. Hibbert testified to the small amount of precipitate found in the Edison Cell, only about $\frac{1}{2000}$th part of the whole active material being deposited after running a car 3,000 miles. About 20 per cent. of this deposit is graphite and the remainder iron and nickel oxides.

Mr. Hibbert made the interesting statement that he had already under test an improved Edison Cell whose weight for the same capacity did not exceed 13 lbs. and from which even better results were expected than those from which the data for his paper was obtained. Of the sixty Edison Cells now doing duty on a London cab, nine have lost about 50 per cent. of their capacity. Mr. Hibbert stated that he had already restored the capacity of one of them to 80 per cent. of its normal value and anticipated a complete recovery for them all. He also observed that he had hopes of preventing further breakdown by submitting the cells to a treatment he was then experimenting with.

Dr. Fleming remarked on the long first charge necessary when the cells are received from the makers; this Mr. Hibbert attributed to the fact that the cells were sent over from America in a dry state, and that consequently a certain amount of oxidization occurred. Also the first charge would naturally have to create more active material than the subsequent recharges, which have only to make good the amount by which the cells are run down.

It was definitely stated that no local action had been observed between the grids and the active material. Some difficulty seems to be experienced in knowing precisely when the Edison Cell is fully charged, and this, Dr. Fleming remarked, was best ascertained by noting a rapid rise in the open circuit voltage.

Apparently no change takes place in the density of the electrolyte during discharge, and this makes the similarity in shape of the discharge curves of the Edison Battery (reproduced in our issue of November 14th, 1903), with those ordinarily obtained from lead cells, an interesting comparison, with regard to which no satisfactory explanation was elicited, although Mr. Wade asked if any definite reason could be assigned to account for the very rapid fall noticed at the beginning and end of discharge, remarking that Mr. Hibbert had always attributed a similar phenomenon in the lead cell to change in electrolytic strength so far as the fall at the end of discharge was concerned.

Among others who took part in the discussion were Messrs. Cooper, Datshell and Joly, the last-named gentleman offering certain favourable evidence relating to lead cells obtained from the numerous experiments which he has conducted upon them.

ON Wednesday four members of the Society of Motor Manufacturers and Traders gave evidence on behalf of that Association before the Local Government Board Departmental Committee on Heavy Traffic Regulations. The gentlemen who appeared as witnesses were Messrs. J. E. Thornycroft, Sidney Straker, John H. Toulmin, and H. G. Burford.

THE Collier Tyre Company, of 210, Shaftesbury Avenue, London, have issued a neat little pocket-book, which will be found exceedingly useful to motorists. It contains, amongst other handy information, an extensive list of hotels, and of the agents in all the principal towns where petrol can be obtained, a useful memorandum-book for entering the cost of maintenance of one's car, a mileage-register, a list of lamp lighting-up times at different periods of the year, an almanac, a memorandum-table, and a reprint of the new Act. In addition there is a distance table, a number of selected routes to the principal towns, the gradients of the chief British hills, and a number of "Useful tips" and "First aid hints in emergencies." A somewhat significant provision is the section for "Things lent." No motorist should miss the chance of securing a copy of this very practical "companion."

RACES, RECORDS, AND TRIALS.

Gordon Bennett Items.—Very little that is new has transpired since last week concerning the Gordon Bennett Race. The question of the local hotel charges is creating widespread discussion, and it is hinted that in the event of the proprietors not keeping their demands within reasonable bounds, that the burgomasters of the towns will take the matter up and fix the prices in similar fashion to the custom which prevails at Bayreuth during the Wagner festivals. Autocratic powers of this description therefore have their advantages sometimes. The suggestion of the Hotel Proprietors' Syndicate that the tariff issued *is* reasonable is ludicrous. A minimum of £1 per night for a bed, which must be engaged for not less than eight nights, is hardly what most folk would term giving accommodation away.

Following upon the plan adopted at last year's race at Ballyshannon, the Germans propose erecting an enormous grand stand to accommodate 10,000 persons. This, as at Ballyshannon, will span the racing track, and will be built of steel.

Fritz Opel, one of the drivers of the Opel-Darracq team, is reported to be trying the paces of his car on the Frankfort-Mainz Road, where it runs parallel for about 8 kilometres with the railway. Opel makes a point of pacing the Ostende-Vienna express train and usually comes off best. The sporting instinct in the engine driver naturally comes into play, and excitement consequently rises high both on the engine and amongst the more observant passengers.

The colours for the different nations' cars will be the same for those who took part last year, viz., Germany, white; England, green; France, blue; America, red. For Belgium, yellow has been selected; for Italy, black; whilst Switzerland's choice remains in abeyance.

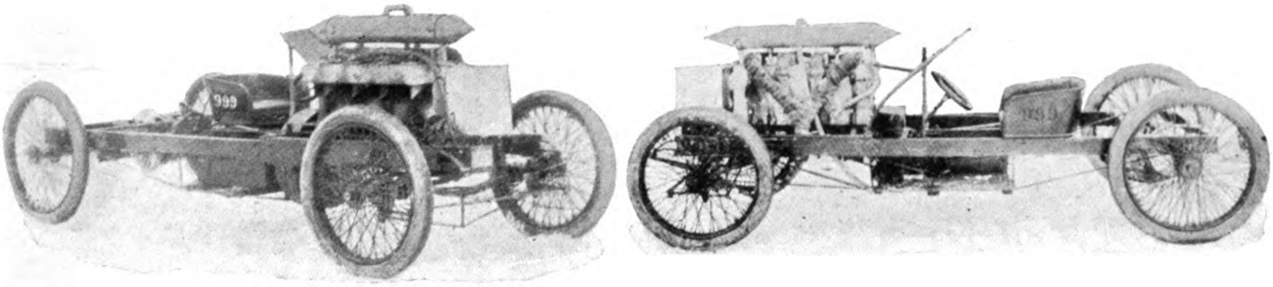
On the night before the race a gala performance is to be given at the Homburg Opera House, at which the German Emperor will probably be present, and, on the day following the race, excursions will be permitted over the course, and in the evening a big banquet will be given by the German Automobile Club. Sunday will be devoted to contests in the Frankfort Hippodrome, and a "concours d'elegance" will be held at Homburg the next day.

In America counsel is being given that it would be better for the United States to be unrepresented than that untried cars should be put forward to compete with such formidable rivals as will be in the field on behalf of the European competitors. A Transatlantic contemporary frankly admits that last year for the American team, "however unfortunate, and however mitigated by circumstances, the defeat was nevertheless overwhelming." Continuing, our contemporary speaks out plainly, and with sound common sense, as follows:—

> "To pit unknown, untried, and, by comparison, underpowered cars against the pick of Europe's best known and best tried cars strongly suggests folly, and unless the trials prove beyond peradventure that the American candidates are able to cope with such formidable rivals, it is the duty of the Automobile Club to place a prompt and decisive veto on their aspirations. Better far that we be not represented at all than that we be misrepresented or poorly represented, and it must be regretfully admitted that present appearances justify the statement that America's chances in the race are on a par with the chance of the proverbial snowball in Hades."

The plans for the British eliminating trials will probably have to undergo considerable modification, owing to the unreasonable demands made in Belgium for running over the Ardennes course. Something like £200 per car is asked.

As we stated some time ago, it is quite possible that Mr. Charles Jarrott may be found in the British team after all. Negotiations to that end are now in progress, and we hope to learn later of them concluding success fully.



The re-constructed No. 999 Racing Vehicle on which Ford accomplished his remarkable feat of covering the mile in 39⅖ secs. on an ice track, equal to 91·37 m.p.h.

Ormond Daytona Automobile Race Meeting.—The main results of this fixture, held on January 28, 29, and 30, are some sensational performances by Mr. W. K. Vanderbilt, jun., who appears to have been the hero of the meeting, from start to finish, with his 90-h.p. Mercedes. We recorded last week the marvellous performance of Mr. Vanderbilt in covering the mile in 39 sec., equal to a speed of 92·30 m.p.h., thus beating Ford's remarkable time of 39⅖ sec. on an ice track for the same distance, recorded by us on January 16th. Vanderbilt, however, on the next day beat his own record by putting up a new time of 37⅕ sec. for the mile, equal to 96·77 m.p.h., this fearful speed, however, being eclipsed in the same race by Barney Oldfield on the Winton car, who is reported to have been timed for 36⅗ sec., equal to 98·36 m.p.h., bringing a speed of 100 m.p.h. within measureable distance of accomplishment. In fact, Vanderbilt claims that during practice he succeeded in covering the mile in 35 seconds = to 102·85 m.p.h. But this time has no official recognition. These extra ordinary performances have taken place on the surf rolled stretch of sand extending from Ormond to Mosquito Inlet, Florida, a straight run of about 16 miles. Even when it is high tide there is a broad belt of sand of 150 feet for driving, quite double that width being available when the tide is out. The higher stretch, however, is not in condition for record breaking, and consequently only at low tide can the high-speed races be carried through. After the first day's racing, H. L. Bowden, on a 60-h.p. Mercedes car, covered 15 miles in 10 min. 18 secs. The incoming tide on the first day stopped the completion of some of the races, the finals of these being run off on the next day. In the five miles invitation race, open only to gentlemen drivers, Vanderbilt, after winning his heat in 3 min. 38⅕ secs., came out first in the final in 3 min. 34⅖ secs. He, however, still bettered these times in the open five miles event, when his winning time in the final was 3 min. 31⅗ secs.

Oldfield, who won his heat in 3 mins. 48⅖ secs., did not take part in the final owing to an accident to his Winton car.

On the third day, January 30th, Vanderbilt again scored highest honours on his Mercedes in practically all the events in which he took part. He secured the 10 miles invitation race in 6 mins. 50 secs., and the 50 miles event, which concluded the day's meeting, in 40 mins. 49⅘ secs. In this race H. L. Bowden, on his 60-h.p. Mercedes, was second in 41 mins. 44⅖ secs.; F. A. La Roche third, in 45 mins. 7⅕ secs., on a 40-h.p. Darracq. J. I. Blair, on a 35-h.p. Panhard, abandoned the race at 40 miles.

The following table summarises Vanderbilt's records at this meeting :—

Miles.	Time.		Speed in m.p.h.
	Total.	Per Mile.	
	min. sec.	secs.	
1	39	39	92·3
5	3 31⅗	$42\frac{3}{10}$	85·50
10	6 50	41	87·8
25*	17 2	41·7	86·50
30†	23 52⅕	47·7	75·60
50‡	40 49⅘	49	73·46

* One turning. † Two turnings. ‡ Four turnings.

Vanderbilt's time of 37⅕ secs. in his heat for the mile equals 96·77 m.p.h.

From France comes the news that M. Gobron is anxious to try conclusions with Vanderbilt, with one of his Gobron-Brillié cars, upon the condition that the timing is done by official French timekeepers, and the course approved and measured by the A.C. de France.

A typical part of the road traversed on the 3rd stage, Oneglia to Nice. The road before Mentone.

At Mentone.—A Control during the 3rd stage.

MILAN-NICE-MILAN MOTOR BICYCLE AND HEAVY VEHICLE ENDURANCE TRIAL.

STARTING on January 27th, a motor bicycle endurance trial has been run off between Milan and Nice. The test was organised originally to extend to Turin and then back to Milan, but on the 31st, owing to the bad state of the weather, the full trial was abandoned at Nice, and the remaining competitors returned home from that city. 83 entries were received, and of these 60 started from Milan on the 27th. The first day eliminated 14, and by degrees many were weeded out day by day. On the 29th a 500-metre standing start and "standing stop" competition was held at Oneglia on the Piémont Road. Tamagni on a Marchand machine was first in 59⅕ secs., Brambilla on a Turckheimer coming second in 1 min. 2⅕ secs., Cerizza on a Stucchi being only ⅕ sec. behind. Mentone and Nice were reached in very bad weather, with the result mentioned above, that the trial by general consent was abandoned. About 40 competitors got through to Nice. We give in our two photographs pictures of the country when nearing Mentone. Under the same organisation and at the same time a trial of heavy vehicles was arranged. This class had to traverse four stages of about 120 kiloms. each. Only two entries were received, viz., a Fiat and a Mercedes wagon, and both are reported to have made successful journeys in spite of the fearful weather encountered and the bad state of the roads.

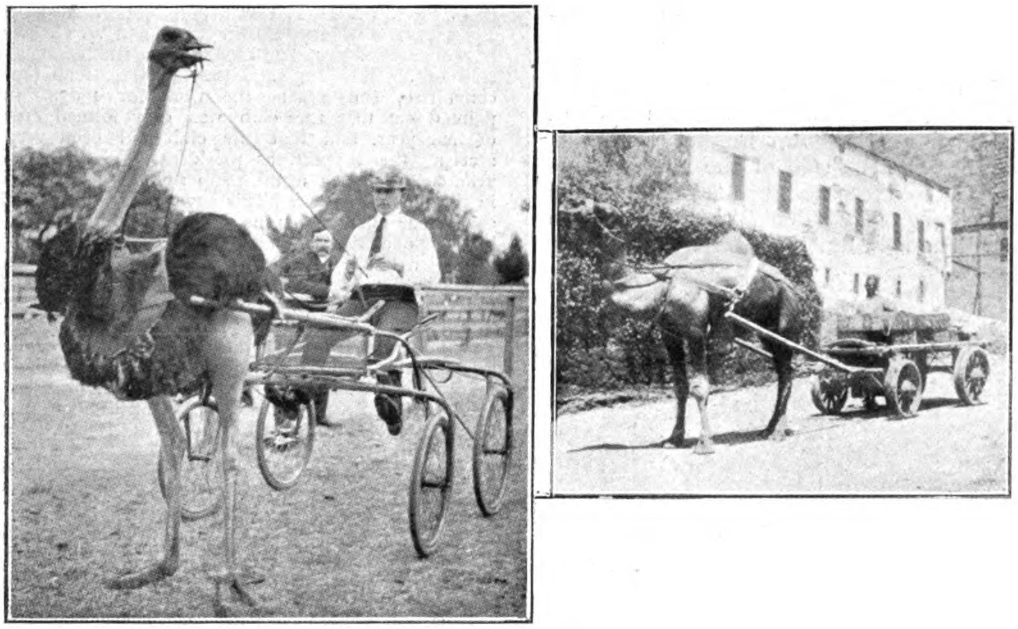
INSTEAD of organising the motor boat races at Frankfort during the Gordon Bennett Race week in Germany, it is now announced, in deference to the wishes of the German Emperor, that a motor boat race meeting will be held at Kiel on July 22nd, which will form part of the programme of the popular Kiel Regatta.

HIS MAJESTY KING OSCAR OF SWEDEN has consented to give his patronage to a Motor Boat Exhibition, to be held in July next, at Marstrand, in Sweden. The Exhibition will give the greatest prominence to motor cargo boats and motor-driven fishing boats. It is anticipated that not only Sweden will take part, but that both Norway and Denmark will be extensive exhibitors.

THE end of August has been selected by the Committee of the A.C. de France for this year's Industrial Vehicle Trials.

The result of the Conference of Manufacturers called by *L'Auto* in connection with their Criterium of Consumption which will be held on March 3rd, 4th, and 5th, has now been published. For the delivery vans there will be 3 categories, viz. (1) vehicles carrying a useful weight of under 500 kilogs., this type representing a rapid van suitable to the requirements of tradesmen dealing in the lighter class of goods. (2) Vehicles carrying a useful load of 500 to 1,200 kilogs., this type being of the design suitable for the heavier work of establishments like the Louvre, Bon Marché, &c. (3) Vehicles carrying a useful load of more than 1,200 kilogs. The body part of all delivery vans must be entirely closed in.

For the heavy wagons there will be 2 categories, (1) for wagons carrying a useful load of less than 1,000 kilogs. (2) Vehicles carrying over 1,000 kilogs. It has also been decided to limit the amount of useful load carried per square metre, a minimum of 1½ square metres of surface being insisted on per ton of useful load carried. A lurry having 1 square metre of carrying surface will therefore not be permitted a load of more than 666 kilogs., the surface is to be measured inside the side and tail-boards.



LOCOMOTION IN OTHER PARTS OF THE WORLD.—Our picture on the left shows an ostrich harnessed to a buggy at Denver, Colorado, and on the right is shown a freight truck with draught camel as used in Cairo, Egypt.

Certain difficulties were encountered in arranging the rules to meet the case of delivery vans owing to the irregular shape of their interiors. It has been decided to make two categories for them, namely: one category with a minimum carrying space of 1 cubic metre, and another category for those with a minimum carrying space of 2 cubic metres, the weight limits per square metre of flat surface being the same as in the case of the lurries.

New York Automobile Show.—The fourth annual Show, which was opened on Saturday, the 16th of last month, in the Maddison Square Gardens, failed to exhibit any sensational surprises. All the well-known makers were as usual represented among the comprehensive display of 258 machines, but the tendency was rather towards perfecting last year's models than to experimenting in any radical change of design. One noticeable feature, however, was the evolution of that peculiarly American creation, the "Runabout," into a miniature touring car. Many of the well-known makes, which had previously faced the world with a plain dash in front, are now appearing with the French bonnet, even though it be only used to hide the petrol tank.

Air cooling is still generally employed on the smallest cars, and even one or two of the larger models have resorted to the doubtful expedient of relying on a fan draught in conjunction with fin-covered cylinders as the only means of dissipating the waste heat. In general, far more attention was paid to the decoration of the exhibits than of the stands on which they were displayed, there being quite a number of admirably-finished chassis on view, these, in some cases, again being placed on mirrors to facilitate the inspection of their under parts.

Among the features of the Show the following details, seen on the various exhibits, may be noted:

The Peerless Motor Car Company have made a slight change in the form of clutch used, and are now showing on their cars clutches of the internal conical type.

The manufacturers of the Winton Car have also adopted the above form of clutch, but it has metal to metal faces in which the engaging members are formed of case-hardened steel and phosphor-bronze, the whole being arranged to run in an oil bath.

The Desbron Motor Car Company have a peculiar form of radiator, composed of six horizontal shelves, each individual shelf forming a honeycombed radiator, in which the air passages are vertical.

A feature of the Twombly Car, which formed one out of the nine steam vehicles which represented this branch of the industry at the show, is its fireproof construction; both body and floor are of aluminium, while steel wheels are used.

The White Sewing Machine Company showed no radical departures in their exhibit of White Steam Cars, although minor improvements have been introduced to still further increase the efficiency.

The Franklin Manufacturing Company exhibited a 24-h.p. chassis carrying an air-cooled motor, the steel cylinder of which has copper radiating ribs brazed to it.

The Consolidated Motor Company, who now carry on the business of the Moyea Automobile Company, have on this year's model a variable-speed friction gear of the wheel and disc type.

The Waltham Manufacturing Company, whose Orient buckboard is so well known among the light Runabout Cars in America, have adopted a two-speed change gear in place of the direct drive formerly used.

The Haynes Apperson Company have mainly been content to still further develop their former design. A novelty was introduced, however, in the form of an adjustable steering pillar.

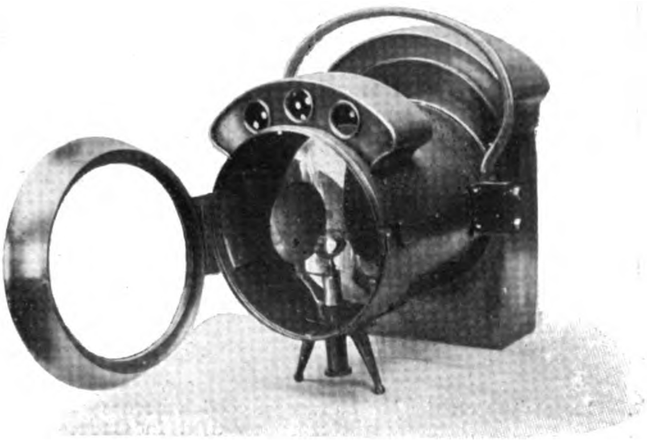
The Packard Motor Car Company exhibited two distinct styles, one of them being the unaltered last year's design, and the other a copy of the ordinary European car, of which their "Gray Wolf" Racer is an example.

The Upton Machine Company have arranged the headlights of their car to follow the movements of the front wheels, a feature which is said to add no small amount to the safety of negotiating corners in the dark.

The Eisenhuth Horseless Vehicle Company exhibit an interesting car, in which is a 60-h.p. Graham-Fox compound petrol engine, having two high-pressure, 4-stroke cycle, cylinders of 7½ in. bore, exhausting into a single low-pressure cylinder of 12 in. bore. The stroke is 6 in. The speed of the motor is 800 revs. per min., and its weight about 500 lbs. This system was described by us on January 3rd last year. A considerable economy in fuel consumption is claimed by the makers, which, they assert, amounts to as much as 47 per cent.

The American Coil Company display an interesting novelty in the form of a hydraulic transmission gear, in which a 4-cylinder pump is employed to supply oil to work two motors situated on the rear axle, one motor being employed to drive each wheel, and the stroke of the pumps being variable.

We have referred on a previous occasion to the improvements in motor car lamps which, following suggestions that have been put forward originally, we believe, in these columns, have been adopted by Messrs. J. G. Statter and Co. of Birmingham. The above photograph of one of their lamps is almost self-explanatory. It is designed, as our readers will remember, to reduce (when going through traffic or where other users of the road are likely to be unpleasantly affected) the glare produced by acetylene lamps with powerful reflectors. A disc of blackened metal, shown in the illustration, between the burner and the side of the lamp, can be brought round so as to intervene between the flame and the reflector by simply operating a Bowden cord from the driver's seat. The light then becomes a light merely within the meaning of the Act, enabling foot passengers and other users of the road to see that a car is approaching them, but not diffusing the slightest glare. On re-emergence into open roads, where it is important to the driver to see some distance before him, he operates his Bowden cord to restore the blackened disc to its original position, and the lamp then diffuses once more its full radiance. Messrs. Statter and Co. also fit a second translucent screen, which may be brought into position between the light and the glass to facilitate travelling in fog, thereby making use of the fact to which we have drawn attention, that a light screened in this manner enables the driver to see much further into a foggy atmosphere than he is otherwise able to do.



Sir W. G. Armstrong, Whitworth and Co., Limited, of Newcastle-on-Tyne, have taken over the entire patents and rights in connection with the Wilson and Pilcher petrol cars.

CLUB DOINGS.

March 9th is the date fixed for the general meeting of the Automobile Club.

Burnley and District Automobile Club.—Last week, at a meeting of the club, Mr. Burton, electrical engineer of Blackburn, gave an interesting paper on electric ignition. Mr. Burton dealt, in detail, with the various systems of ignition, and gave some details as to the construction and working of the coil. He expressed his opinion that in a short time the coil would be abandoned. An interesting discussion followed, in which Messrs. G. H. H. Clement, T. G. Parkinson and Mr. S. Lawson, the hon. secretary, participated.

For the end of February a second paper is promised by Mr. Harold Smith, on the subject of "The Latest Improvements in Cars."

The annual meeting is fixed to take place on Tuesday next.

Eastern Counties Automobile Club.—Mr. F. L. Bland, chairman of the committee, presided at the annual general meeting of this club, which was held last week at the Great White Horse Hotel, Ipswich. Amongst those present were:—Dr. C. K. Moseley (hon. sec.), Dr. E. L. Rowe, and Messrs. A. Hackblock, J. R. Egerton, C. C. Ching, Edwin Sayer, and W. G. Fisk. The chairman announced there had been a considerable increase in membership during the year, and the hon. sec. read the report of the committee, summarising the work for 1903. In this it was pointed out that the club was only formed on January 28th of that year, and that the club had been very fortunate in securing the support, as president, of Lord Stradbroke. The year closed with a membership roll of 51, many being residents in the neighbourhood. This gave promise of considerably larger attendance upon club runs during the 1904 season, which would help to popularise the club and the pastime. The accounts submitted showed a credit balance in the hands of the treasurer. It was determined to increase the number of the committee from 6 members to 9, and upon the motion of the chairman, the Earl [illegible] Stradbroke was re-elected president for the year. Dr. Moseley was again elected hon. secretary and Mr. E. P. Ridley hon. solicitor, the new Administrative Committee being constituted as follows: Mr. F. L. Bland (ex-officio, as chairman), Major Carthew, Mr. A. Hackblock, Mr. Godolphin Milbank, Captain Duff (Bury St. Edmund's), Mr. Robert Page (Great Clacton, Essex), Mr. W. P. Burton, Mr. A. C. Churchman, Dr. Rowe, and Mr. E. C. Sayor. Mr. F. L. Bland was again re-elected to act as chairman.

Following the elections the affiliation question was discussed, and it was determined to leave the question in the hands of the committee on condition that the capitation grant should not exceed 5*s*.

The arrangement of the club runs for the season was also left to the committee, and Mr. Ernest H. Arnott was elected a new member of the club.

A communication from the Adjutant of the Motor Volunteer Corps led to a discussion, but no practical result followed the suggestion contained in the communication.

Lincolnshire Automobile Club.—The members of this club held a very enjoyable dinner at the Red Lion Hotel, Boston, on Saturday evening, January 30th, and in connection therewith Dr. Gilpin, of Bourne, read an excellent paper on "The Cost, Care, and Upkeep of a Motor." The president of the club (Sir Hickman Bacon, Bart.,) was prevented from attending the gathering owing to an attack of influenza, but a letter was read from him which stated that the Lindsey County Council had decided not to enforce the legal limit anywhere, but to rely upon Section 1 of the Act, and not to impose any limit or close any roads. Sir Hickman further stated how desirable it was that there should be no division in the ranks of automobilists. Capt. J. A. Cole, J.P., presided, and in addition to about twenty members, there were also present Supt. Adcock, of the Boston police, and Mr. B. B. Dyer, clerk to the Boston magistrates. Dr. Gilpin's paper was full of interest. With regard to the cost of a motor car he did not think that it would come down to any appreciable extent, because four years ago two-seated cars were selling at exactly the same price as they were now. They certainly got better mechanism now and for the same money. About the care of a motor car he urged them to do whatever they could themselves. If they employed anybody they should take care that they knew as much as they did. Concerning the upkeep, there was no doubt that tyres were the most expensive item. Personally he would not go back to solids, because in spite of their liability to puncture, pneumatics were infinitely superior. They should not use a brake oftener than they could help, and his experience was the less they used it the better. He always advised careful driving round corners, and changing gear as seldom as possible. A discussion ensued, in which the chairman, Mr. C. W. Pennell, J.P. (Lincoln), Dr. Husband (Crowland), Mr. C. Holland (Boston), Mr. R. M. Wright (Lincoln), Dr. F. H. Cragg (hon. sec., Billingborough), and Mr. Godfrey Lowe (Lincoln) took part. Mr. Penrell stated that he always wore his tyres until the fabric was through, and then he had them re-rubbered. He considered they were then better than before. Votes of thanks to the chairman for presiding and Dr. Gilpin for his paper were carried with acclamation. Several friends of the Boston members came in after dinner to hear the debate, and the proceedings passed off most pleasantly and successfully.

Scottish Automobile Club (Western Section).—Last Monday evening, the 1st inst., in the Windsor Hotel, Glasgow, Mr. R. Drummond, C.E., F.S.A., read a highly interesting paper on "The Evolution of Roadmaking in Scotland." There was a fair attendance of members, the meeting being presided over by the Section chairman, Mr. John Adam. The chairman in introducing Mr. Drummond referred to the splendid roads in the county, Renfrewshire, of which he is county surveyor, and to his qualification to speak on the subject.

Mr. Drummond in opening traced the origin of the "King's highway" to its being ordained as one of three places of succour or refuge by Moluncius, twenty-third king of the Britons.

Mr. Drummond then traced the origin of Scottish roads through the Act of 1617, empowering Justices of the Peace to mend highways to market towns and seaports, such roads to be not less than twenty feet wide; the Act of 1661, which was a renewal of that named; the Act of 1669, introducing the system of personal service or labour on the roads, known as Statute Labour; the Scotch Turnpike Act of 1713 relating to the County of Edinburgh only, which was promoted, a remark which applies to subsequent Turnpike Acts, by proprietors of the lands through which the roads passed, and which authorised these proprietors to erect toll-bars, and levy tolls to reimburse them for their outlay. Reference was then made to the fact that coaches found little favour with the populace because they were supposed to injure trade, and that so recently as 1740 carts in Scotland were looked upon as curiosities, that in 1740 the Glasgow Town Council tried to institute a stage coach between Glasgow and Edinburgh, but the project fell through, but that in 1749 such a service was begun. The Highway (Scotland) Act of 1770 provided the power to take ground and make compensation to proprietors. In 1831 the system of Statute Labour, which fell most heavily on the working classes, was commuted by an annual payment. Between 1750 and 1844, 350 Roads and Bridges Acts were passed, and road and bridge making made rapid progress. The connection of Macadam and Telford, two Scotsmen to whom our present highways are largely due with the question was traced, until in 1824 the new Great North Road from London to Edinburgh was engineered by Telford, but was abandoned on account of the competition of railways. Improvement had gone on till in 1840 road-making came practically to an end.

In 1878, the Roads and Bridges (Scotland) Act for the first time placed the control of roads to a partial extent in the hands of the public, which was completed by the Act of 1889 constituting County Councils and placing the roads under the immediate control of the representatives of the people.

Mr. Drummond then entered into the question of financial administration, showing that assessment varied in Scotland from 3½*d*. to 1*s*. 5*d*. per £ on the valuation payable equally by landlord and tenant, and that in Scotland to-day there are 21,400 miles of country roads. By means of a vari-coloured map he showed the members how the rates varied, attributable to a number of causes such as geographical positions, vicinity to large towns, high or low rateable value, &c. He showed how, under the toll system, the main roads were well maintained while the local roads were neglected, a condition of things now reversed; he stated that our roads were being used to a greater extent every year; that there is no such classification of roads in Scotland as in England, but that there is no clashing of authorities with us as exists to some extent in England. He then referred to the improved and easier methods of road making and maintenance resulting from the use of the road roller, and went into the question of using petroleum and other articles for dust prevention, suggesting that the S. A. C. should undertake experiments to assist in solving the problem.

After referring to the work of the Departmental Committee on Roads, he devoted some time to demonstrate the best contour of road surface, depreciating excessive camber as worse than useless.

A discussion followed, in which several road authorities, including Mr. Nisbet, Master of Works, Glasgow, and others took part. A vote of thanks concluded the proceedings.

Our picture shows the poster of the Turin International Automobile Exhibition which opened this week.

Sheffield Automobile Club.—A very successful first annual meeting of the members of this club took place at the Wharncliffe Hotel, Sheffield, last week. Mr. Herbert Barber presided, and the report and statement of accounts were carried unanimously.

For the ensuing year the following officers were elected, the selection of president being left over, viz.: vice-presidents, Messrs. Harvey Foster, Herbert Barber, Duncan Gilmour, and James Barber; treasurer, Mr. E. F. Coupe; hon. secretary, Mr. F. B. Cawood; committee, Messrs. A. J. Blyde, W. Coldwell, C. A. Clarke, S. E. Fedden, E. H. Hill, Benj. Hind, W. James, J. W. Needham, J. T. Thompson, and J. R. Wade.

The chairman said he thought the committee were to be congratulated upon the steps taken with regard to the new Act by means of which they had got the authorities to act in a reasonable way with reference to the imposition of the 10 mile limit regulations in contrast to what had been done in some districts. He thought it was due greatly to the excellent Chief Constable and Town Clerk which the city possessed.

The question of affiliation was left by the meeting in the hands of the committee. It was decided to support, as far as possible, the Theatrical Profession Carnival arranged to take place on Thursday of this week, in aid of the Lord Mayor's Distress Fund. A number of those present promised to assist in the procession by driving their cars. A hearty vote of thanks to the chairman of the club concluded the meeting.

The following fixtures have been arranged for February, viz.:—For cars to meet at the Town Hall, Feb. 27th, at 2.30 p.m., a run to Castleton. For the Motor Cycle Section the runs arranged are Feb. 11th, Blythe; 13th, Grindleford; 18th, Baslow; 20th, Worksop; 25th, Bawtry; 27th, Castleton. A special party of club members is being made up for the purpose of visiting the Automobile Show at the Crystal Palace about Feb. 15th.

During each year an enormous number of "paper corporations" are registered in New Jersey, United States, and periodically the Governor of the State annuls their charters when default or failure to pay the State taxes occur. A list of those who have brought themselves into this category for the year 1901 has just been published, and the astonishing number of 33 corporations, directly or indirectly established for taking up automobile work, have been proclaimed non-existent.

H.R.H. THE PRINCE OF WALES has conformed to the new law by registering his car.

COMMENCING on Monday last, a service of motor omnibuses was announced to start running between Forest Hill Railway Station and Camberwell, *via* Peckham Rye.

ON Feb. 14th a Children's Fête is to be given by the A.C. of France, at their clubhouse, followed by a children's ball. These functions will be exclusively reserved for the families of members.

ALIVE to the earning powers of a competent automobile driver, the Governors of Bray Technical Schools in Ireland have recently opened a training class for chauffeurs. The class is open both to professional and non-professional drivers.

REFERRING to our front paragraph on the subject of the development of the automobile industry in India, we would point out that manufacturers who wish to export are invited to forward catalogues and particulars to Mr. Rolfe at 3, Council House Street, Calcutta.

IN the final list of French automobile exhibitors at the St. Louis World's Fair are the names of A. Clement, Darracq, De Dietrich, Fouillaron, Falconnet and Perodeaud, Jeantaud, Krieger, Michelin and Co., Mors, Panhard and Levassor, Renault, Georges Richard and Turgan Foy.

IN several directions Vaurs carburettors have been sold in Great Britain by firms claiming to have the agency. We learn that M. Vaurs, of Paris, has now placed the sole agency in the hands of the United Motor Industries, Limited, of 45, Great Marlborough Street. The new models of this carburettor will be on view for the first time at the forthcoming Crystal Palace Exhibition.

LAST week, at the meeting of the Executive Council of the County Councils' Association, the report of the Motor Cars' Committee, and the recommendations agreed to at the conference between representatives of the County Councils and Municipal Corporations Association, and of the Local Government Board and the Scottish Office, were considered and adopted, with one slight alteration. Among the designs for warning boards, it was suggested that the one indicating dangerous spots should be painted green. In view of the fact that red is generally recognised as a sign of danger, it was decided that the hollow triangle denoting danger should be of that colour instead of green.

WITHOUT question the Automobile Show, which opens at the Crystal Palace on February 12th, will be the finest exhibition ever held in this country. Already the whole of the interior of the building is practically given over to the preparations for the instalment of the various stands, and the inaugural luncheon, on February 13th, at the Palace, promises to be an extremely interesting ceremony. The chair will be occupied by the Hon. John Scott Montagu, M.P., and amongst a long list of guests who will be present are the names of Lord Stanley, Lord Hothfield, Col. Holden, Lieut.-Col. Mark Mayhew, Maj.-Gen. Sir Chas. Knox, Sir Bache Cunard, Earl Russell, the Hon. D. Greville, M.P., Mr. George Montagu, M.P., Sir Edward Jenkinson, Lord Claud Hamilton, Count de Lalaing, Lord Norbury, Sir J. Macdonald, Mr. Rutherfoord Harris, M.P., Lieut.-Col. Waring, Professor C. V. Boys, Sir Edgar Vincent, M.P., Captain Nugent, etc.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Ferguson's Carriage Company (Limited), 68, Bradford Road, Shipley, Yorkshire.—Capital, £5,000 in £1 shares. Object, to adopt an agreement with J. W. Ferguson, and to carry on the business of cab and carriage proprietors, motor and other omnibus and vehicle proprietors and manufacturers, &c. First directors—J. W. Ferguson and J. C. Ferguson.

W. F. French and Sons (Limited), 314, High Road, Balham, S. W.—Capital, £2,500 in £1 shares. Object, to acquire the business of a cycle and motor trader, hirer, maker, and repairer, carried on by W. F. French, at 314, High Road, Balham, as W. F. French and Sons. First directors—G. A. Crosland, W. H. Crosland, W. F. French, Mrs. L. Crosland, Mrs. N. Crosland, Ethel F. French, and E. Crosland.

Grande Maison D'Automobiles (Limited), 366, Euston Road, N.W.—Capital, £10,000 in £1 shares.

A. G. Mulliner Motor Body Company (Limited), 61, Oriel Road, Bootle, Lancashire.—Capital, £2,000 in £1 shares. Object, to adopt an agreement with A. G. Mulliner and T. C. Usher for the acquisition of the business carried on at Church as the Mulliner Motor Body Company. First directors—J. J. King and J. W. Wall.

Selbach (Limited), 66 and 66a, Great Russell Street, W.C.—Capital, £80,000 in £1 shares. Object, to carry on the business of automobile, motor car, engine, and carriage builders, &c. Oscar C. Selbach is the first director with power to nominate two others.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published January 28th, 1904.

1,031.	A. H. P. BLUNT	Propelling and steering aerial machines.
1,218.	H. CROUAN.	Safety coupling for change-speeds.
1,219.	H. CROUAN.	Automatic carburettor.
2,172.	A. CRAIG.	Change-speed mechanism.
4,220.	HUMBER (LIMITED) and others.	Frictional driving clutches.
4,796.	E. PERKINS AND J. A. ROWCLIFFE.	Differential gear.
4,798.	E. PERKINS AND J. A. ROWCLIFFE.	Carrier plate for boilers.
4,799.	E. PERKINS AND J. A. ROWCLIFFE.	Change-speed-gears.
6,200.	B. CRAWFORD.	Exhaust silencer.
24,634.	SOC. AUTOMOBILES "HERALD."	Brakes.
25,171.	MARTIN AND LETHIMONNIER.	Cylinders mechanism.
25,588.	SOC. D'AUTOMOBILES MORS.	Valve controlling.
26,498.	J. SPYKER.	Explosion motors.
26,499.	J. SPYKER.	Steering gear.
26,720.	J. H. BISHOP.	Starting device.

Published February 4th, 1904.

607.	L. RENAULT.	Steering gear.
735.	W. ROURKE AND W. W. HORSBURGH.	Fitting to prevent side-slip.
857.	P. STEINHAUER.	Driving and steering gear.
952.	H. C. MARX.	Internal combustion engines.
959.	B. H. THWAITE.	Internal combustion engine .
1,288.	A. G. MELHUISH.	Internal combustion engines.
2,125.	J. WELLER.	Speed-change transmission gearing.
2,381.	M. J. P. O'GORMAN.	Internal combustion engines.
2,422.	F. W. LANCHESTER.	Steering and controlling mechanism.
2,805.	C. JENATZY (FILS).	Magnetic clutches.
3,799.	A. B. BROWN.	Reversing valve gear.
5,129.	E. PHILLIPS	Axles.
5,720.	WOLSELEY TOOL AND MOTOR CAR COMPANY AND H. AUSTIN.	Means for regulating proportions of air and liquid fuel.
5,845.	H. F. JOEL.	Construction of electrodes.
5,920.	T. SLACK AND T. WHITAKER.	Stands or jacks.
6,145.	W. FENNELL AND W. P. PERRY.	Storage batteries.
6,455.	W. J. CROSSLEY AND W. WEBB.	Internal combustion engines.
6,461.	WOLSELEY TOOL AND MOTOR COMPANY AND H. AUSTIN.	Combined means for mechanically operating the inlet valve or the exhaust valve and causing the ignition and the charge.
8,677.	M. E. P. CHABOCHE.	Burners for heavy petroleum.
18,934.	H. PRATT AND F. VINCE.	Electric storage batteries.
21,195.	L. S. VAN WESTRUM AND WESTRUMITE (LIMITED).	Method of making roads.
23,482.	G. ROSSET.	Secondary batteries.
25,150.	G. HONOLD.	Generators for electric ignition.
25,953.	P. ARBEL.	Frames.
26,137.	SOC. CHENARD, WALCKER, AND CO.	Carburettors.
26,592.	SOC. DES MOTEURS THERMIQUES.	Valve gear and ignition apparatus.
27,210.	J. WYSS.	Spray vaporisers.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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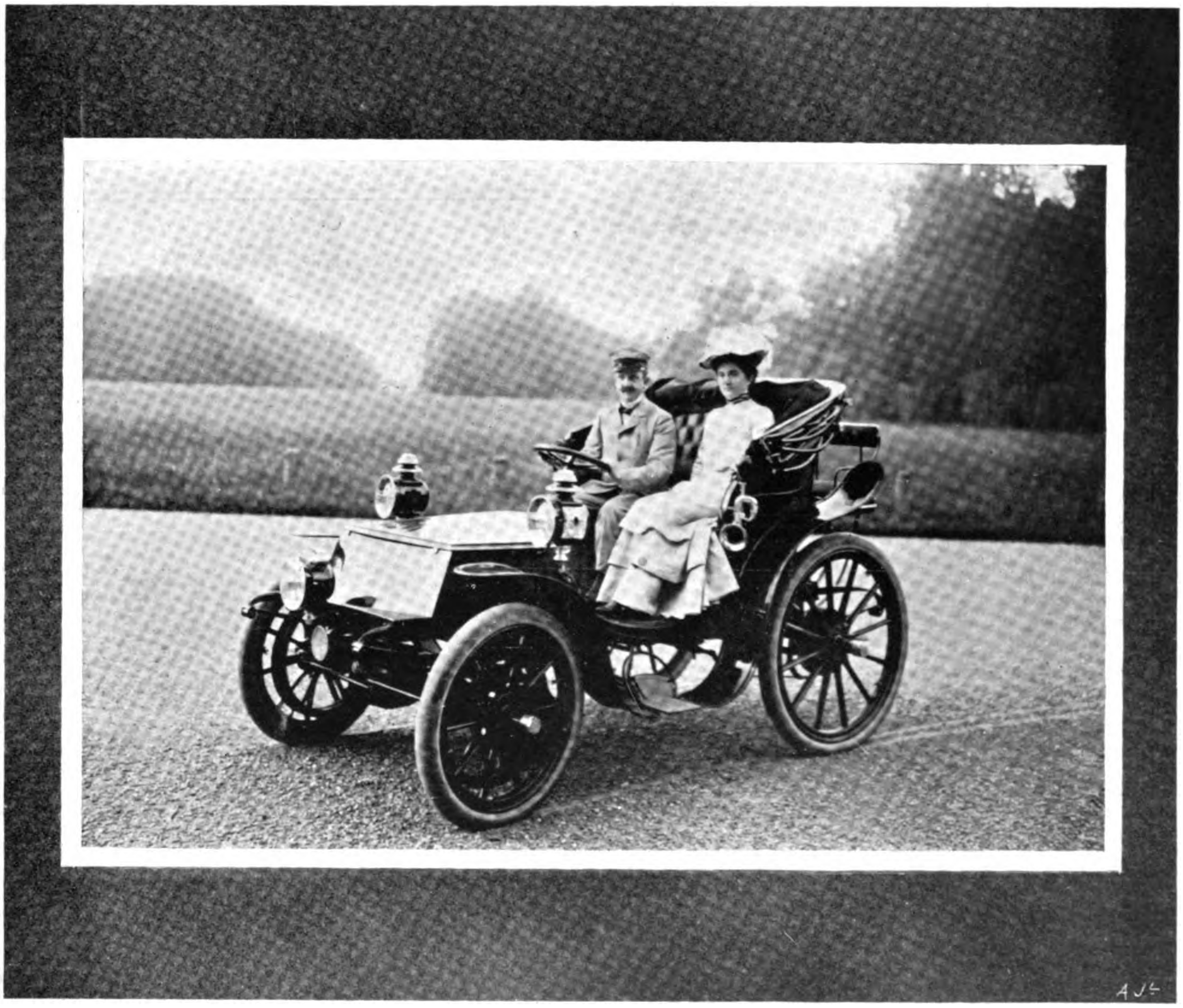

The King and Queen of Italy are, as everybody knows, most enthusiastic automobilists. They are here shown in their two-seated victoria, to which the Queen is particularly devoted, and in which she makes long excursions, frequently by herself, as she has now become quite an expert driver.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Feb. 12–24 ...	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
Feb. 15 ...	A.C.G.B.I. and Provincial Clubs' Conference.
*Feb. 18 ...	"Aeronautics and Ballooning as a Sport," by Mr. C. F. Pollock (A.C. Paper).
Feb. 23–27 ...	Hull Cycle and Motor Show (Assembly Rooms).
*Feb. 25 ...	"The Manufacture and Use of Pneumatic Tyres," by Mr. J. C. Siddeley (A.C. Paper).
Feb. 25 ..	"Motor Vehicles for Goods Transport," by Mr. J. E. Thornycroft, A.M.I.C.E. (Glasgow Un. Engineering Society).
Feb. 27 ..	"Wire Wheels Tyred," by Mr. F. W. Lanchester (Mid. A.C.).
Mar. 4 ...	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 10 ..	Automobile Club General Meeting.
Mar. 15 ...	"Cost, Up-keep, and Care of an Autocar," by Messrs. J. Adam and J. H. Steen (Scottish A.C.).
*Mar. 17 ...	"Valves and Valve Mechanism of Internal Combustion Engines," by Mr. R. E. Phillips, M.I.M.E. (A.C. Paper).
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24 ...	Smoking Concert.
Mar. 25–30 ...	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May ...	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ..	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Feb. 6–21 ...	Turin Exhibition.
Feb. 14 ...	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Feb. 15–20 ...	Detroit Show.
Feb. 23–27 ...	Anti-Skid Trials at Versailles.
Feb. 29–Mar. 5	Cleveland Show.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 3, 4, 5 ..	Fuel Consumption Trials (*L'Auto*).
Mar. 6–12 ...	Buffalo Show.
Mar. 13–20 ...	Cannes Automobile Week.
Mar. 14–19 ...	Boston Show.
Mar. 15–16 ...	A.C. America Commercial Vehicle Trials.
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Mar. 23–27 ...	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Nice-Rome.
May	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 1–12 ...	A.C. Bordelais Automobile Fortnight.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June 7 ...	Namur Week.
June 7 ...	Spa Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
Aug. 5–11	Paris–Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup
Aug. 13–14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Aug. ...	Paris Industrial Vehicles Trials (A.C. France).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Muse Among the Automobiles.

MR. KIPLING has again been providing one of those remarkable proofs of his amazing versatility with which he from time to time enjoys electrifying the public. We are pleased to find that his new departure is dedicated to the service of automobilism, and is to take the form of a number of imitations or parodies of leading English poets, from Chaucer downwards—each of the parodies dealing with some phase or feature connected with automobilism. The first few poems of the series have already appeared in the columns of the *Daily Mail*, which has arranged with Mr. Kipling for their publication. The imitation of Chaucer is delightfully quaint and characteristic, and is very appropriately entitled "The Justice's Tale." It invests the modern chauffeur with a Chaucerian atmosphere in a wonderfully effective and entertaining manner, though, perhaps, the chauffeur so quaintly described comes perilously near in his characteristics to the road-hog whom it is the desire of ourselves and all who have the interests of automobilism at heart to see eliminated with the greatest possible rapidity by the new Act. Nor is it quite fair, we think, to represent the chauffeur as frightening ordinary users of the road by the use of his horn "until they crope into a piggestie." Owing to the tactics generally adopted by the police in organising motor traps, the pigstye has become consecrated in popular imagination (when not needed by its customary occupant) to the use of the ambushed policeman. We would prefer had Mr. Kipling, when dealing with the savoury structure, afforded recognition to the successful manner in which the tactics of the police have permanently associated them with it. The Chaucer imitation is all too short. It would have been delightful had we had a whole long story of the misfortunes of a motorist, say at the hands of police and magistrates, something in the style, say, of "Pelamon and Arcite," from Mr. Kipling's pen. Sixteen lines is not long enough for a real imitation of the Chaucerian style.

A singularly forcible and really vivid imitation of Ben Jonson urges a lady to adopt automobilism, and the vagaries and troubles of electric ignition are portrayed in a quaint and humorous parody of the celebrated satirist, Dr. Donne; while the verses in the style of Herrick have all that writer's fire and almost more. Presumably Mr. Kipling intends to give us a complete series of such imitations coming down to modern times. Should we be presented with an imitation of Shelley, we may hope to encounter something really worthy and illustrative of the force and rush of the modern motor vehicle, to a degree which will show how unsuccessful some recent attempts to embody these features in verse have been.

We never quite like the puff preliminary in regard to poetry, and in the case of Mr. Kipling, particularly where he has adopted such a novel and original departure, it is decidedly superfluous. So we do not feel that Mr. Marriott-Watson's introduction to the verses adds much either to the pleasure or appreciation of the reader. Mr. Watson carefully explains to us that "wood" in Chaucerian English means "mad," but he might have added for the information of many that "roode" does not mean, as many readers we fear will think, the road, but means the cross, or crucifix—"by the rood" being a frequent mediæval form of asseveration. And oh! Mr. Watson, there is no poem in the English language entitled "Piers Plowman." Langland's poem is "The Vision of Piers Plowman."

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More Want of Diplomacy.

IF the publishers of the late Mr. Whistler's "Gentle Art of Making Enemies" should ever contemplate an up-to-date edition of that sprightly work, we would recommend them to procure the co-operation of the gentlemen who at present manage the affairs of the Automobile Club. We make this observation with special reference to the letters of the Society of Motor Manufacturers and Traders, and the official statement made by the club, published in our present issue. It will be obvious to anybody perusing these letters that the action of the club committee on the Exhibition question, in addition to being ill-advised, short-sighted, and a complete reversal of its former dignified policy, as we have already pointed out, was conducted in a way specially calculated, though presumably not designed, to exasperate and annoy a powerful trade body. Even had the committee been well advised in reversing the previous policy of the A. C. G. B. I., solemnly announced a year and nine months ago, even had it been wise to bestow the patronage of the club on one Exhibition while the trade still remains divided on the great question, and even had that patronage been bestowed in such a way that no suggestion of pecuniary advantage to the club could have been made, it would still have been incumbent on the committee, and at any rate only common sense, to bestow that patronage without unnecessarily irritating the organisation to which it had been decided not to give it. It appears from the letters to which we refer, that after the first rupture of negotiations between the Society of Motor Manufacturers and Traders and the club committee, resulting in the bestowal of the club's "patronage" on the Agricultural Hall Exhibition, the Society of Motor Manufacturers and Traders were willing to re-open negotiations in the hope, apparently, that the club might be induced to permit the light of its favour to illuminate its Show, at any rate next year, and a letter was accordingly written by the secretary of the society proposing to re-open negotiations for this purpose. It will hardly be believed that this courteous note has never been replied to on behalf of the club committee. There are occasions in conducting the affairs of life when discourtesy—always unwise—is evidence of monumental incapacity, and we think the extraordinary discourtesy here displayed is an instance in point.

In the light of this extraordinary indiscretion, the fine show of indignation made by the club newspaper over the suggestion, mentioned in a letter from Lord Russell, that the club was bestowing its patronage on the Agricultural Hall Exhibition for the consideration of £500, and the statement by the Editor that such an imputation is a grotesque misrepresentation, borders on the farcical. The official statement in the club's organ has the appearance of protesting too much. It forcibly calls to mind the French proverb, *qui s'excuse s'accuse.* The whole situation is an eloquent commentary on the dangers which, as we have always insisted, are inherent in any attempt to engage in trade on the part of a body like the Automobile Club, which desires (or should desire) to be regarded as a supreme Court of Appeal in automobile matters, and to establish for itself such a reputation for impartiality and strict honour that public authorities, the automobile world and the general public will hasten to invoke its assistance in matters of dispute, and its advice in questions of legislation and administration.

This is the second time which we refer to this unfortunate controversy, and we distinctly desire that our position should not be misunderstood. We are far from hostile to Mr. Cordingley's Exhibition. On the contrary we were extremely pleased to learn that steps were being taken to effect a *rapprochement* between the two Exhibition Associations in which Mr. Cordingley would have played a leading part. When the automobile movement was in its infancy Mr. Cordingley was the first exhibitor in the Metropolis to afford hospitality to the then by no means numerous automobile exhibits which were first displayed at his Laundry Exhibition in 1896 (before the Act), and the first Automobile Exhibition held in the Metropolis took place under his auspices in 1898. For this early encouragement he certainly deserves well of the industry, and he is by no means to be blamed for purchasing what he may consider an asset for his Exhibition. Our contention is, as we argued on January 30th, that, by its action, the club is reversing a policy decided on after solemn and serious consideration, is displaying partiality calculated to injure the industry and mislead the public, and is doing this for money down. Even had the club patronage been bestowed gratis, such action would have been open to the criticism which we have made. The situation is merely accentuated and invested with an unpleasant air of sordidness by the introduction of the pecuniary and other " considerations."

But when all this has been said, it cannot be denied that the chief manufacturers of this country, and many of the chief manufacturers of the Continent, are exhibiting at the Crystal Palace only, and that no Exhibition from which they are excluded can be looked on as completely representative of the industry. A " society of encouragement " should have, above all things, satisfied itself as to which of the Exhibitions is the more representative before deciding upon a course of action. We entirely fail to see that matters are made any better by the exceedingly disingenuous account of the whole proceedings which has been published in the club paper, and reproduced in our columns this week, together with the letters of the society explaining what really occurred. In the first place the club organ states that the Society of Motor Manufacturers approached the club *asking on what terms* the club would grant its patronage. There was no question at all of terms. It merely asked for the club patronage on the ground that it was the most representative Exhibition. It is further not correct to say that the terms proposed were " rejected *in toto* by the society without leaving any loophole for any further negotiations in the matter." So far was this from being the case that the society, as we have explained above, attempted to reopen the negotiations. If the Society of Motor Manufacturers and Traders were capable of a *tu quoque* it would be justified in describing this travesty of what actually took place as a " grotesque misrepresentation."

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To Revivify the Club Committee.

The annual election of the club committee on March 10th, when the whole club will have an opportunity of deciding whether it will retain the same members in office or not, is now rapidly approaching. The infusion of fresh blood into the committee on a large scale would, we are convinced, benefit the club as an institution, and also be of service to the automobile movement. An administrative body which continues from year to year to consist of the same members is liable to fall into a groove, and to take a restricted view of the questions which present themselves for their consideration and decision. We should like to see the next committee more representative of varying automobile interests. If the whole present committee, considering the criticism to which the policy which has been pursued has been subjected, should see their way to resigning, and so afford the club members an opportunity of appointing an entirely new committee, it would be a graceful and self-sacrificing act on their part. In any case, those members of the club who wish to see new members elected should take care that those they wish to vote for are duly nominated in good time, for unless members are nominated they cannot be elected, and, unless attention is given to this point, practically the same committee may be elected over and over again. Such nominations should be made before the 23rd of this month.

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A False Suggestion.

We have always been good friends with the *County Gentleman*, and recognise to the full the amount of friendly support which our contemporary has from time to time given to the automobile movement. We are, therefore, rather sorry to see appearing in its pages an article by the Rev. Arundell Whatton which is calculated to give the readers of the *County Gentleman* a very false impression of the controversy between the Automobile Club and the automobile Press. Mr. Arundell Whatton begins his article on " Motors and Motor topics" as follows :—" The Club and its critics—one cannot help saying a word about the matter, though it is not, perhaps, a very safe wasp-nest to stir up." He goes on to suggest that the automobile Press has carefully selected a time to make an attack when the Automobile Club is struggling in the grasp of three secretaries who, he says, cannot be quite equal to the one they have replaced, and is suffering, in addition, from the resignation of Mr. Wallace. Those who have followed the controversy which has been conducted in the automobile Press in regard to the club will recognise at once that this statement of the case is a misstatement of facts which is calculated to convey a very false impression of what has actually taken place. What the automobile Press has felt called upon to say in regard to the policy of the club has been entirely dictated by an interest for the welfare of the club and the future of the automobile movement. The necessity for enforcing the protests which have been made has arisen from the adoption of unwise and disastrous courses of action. The present three secretaries have been managing the affairs of the club for practically a year. We do not know how long Mr. Whatton thinks their management ought to be regarded as above, or at any rate remote from, criticism on the ground of their inexperience. Mr. Wallace has only just signified his resignation. If criticism of the proceedings and policy of a body like the Automobile Club is always to be set down as illegitimate whenever there are changes in the *personnel* of its staff, it would be quite impossible to criticise its proceedings at all. When the Automobile Club or any other body prominently connected with automobilism makes, what we consider, mistakes, we shall point out those mistakes, and we have no doubt that our colleagues will do the same. We have never made a personal attack, so that arguments which would be relevant, if we had done so, have consequently no bearing at all on the controversy which we, and other members of the automobile Press, have raised. In conclusion one cannot avoid a certain mild amusement at Mr. Whatton's opening sentence which we have quoted above. He suggests that though the particular wasps' nest to which he refers is not a safe one to stir up with impunity, there are others which can be "stirred up" without danger. Would Mr. Whatton tell us what and where they are?

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Official Encouragement Across the Channel.

The French authorities still continue to encourage the automobile on a very extensive scale. There are a large number of country districts in France which are not served by railways, and in which the post both for letters and parcels has to be conveyed by the time-honoured "diligence." The French Post Office has now decided to open twenty of these lines to automobile competition, and is prepared to receive tenders from automobile firms for running these twenty different services, together with an estimate of what they will charge for doing so. Should automobile transport be adopted as the result of the tenders, which will, no doubt, be sent in (and this is to be looked upon as probable), the adoption of motor vehicles for public service on so extended a scale cannot fail to have the most beneficial results on the French industry. We would like to see our own postal authorities extending their experimental encouragement of automobilism on a similar scale. They need have practically no fears as to the outcome of any such action on their part. The great railway companies have shown initiative in this respect, having established a number of motor car services for feeding their out-of-the-way stations, which have in most cases proved remunerative and successful, so that there can be little doubt that similar results will be obtained in connection with postal delivery.

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A Jobmaster Among the Prophets.

That the mantle of prophesy should have descended upon the shoulders of a jobmaster provides a situation at which the most serious could hardly avoid a smile. It is, of course, in reference to the growing popularity of the new locomotion that the jobmaster in question has taken up his parable. He has informed a representative of a daily paper that he is not uneasy about the future. The horse market, he admits, is very much depressed at present, and has been depressed owing to the fashionable craze for the motor car, but the jobmaster looks upon all fashionable crazes as temporary, and is convinced that the predilections of the wealthier members of society will surely return to the horse in preference to the automobile, and that British horses will consequently in the near future cease to be exported to Paris, Vienna, and Buda-Pest. Well, no doubt the jobmaster is right, that fashionable crazes are often temporary, but they are not temporary when they are supported by a sub-stratum of real utility. Fashionable prejudice often opposes the introduction of a new appliance, as in the case of the bicycle, but having once admitted it, fashionable society generally continues to tolerate it even if the new amusement ceases to be a craze. As it has been with the bicycle, so it will unquestionably be with the automobile. When it ceases to be an amusement and a plaything it will have all the greater popularity as a useful everyday necessity of existence. Of course for riding the horse will always command a market, and will probably be more generally let out for that purpose in the future than in the past, and we should like to see this among other results produced by automobilism. Riding is much pleasanter work for the horse than traction, and he is far more supreme in that field. He will be happier and his employers more satisfied.

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Further Encouragement for Aviation.

Messrs. Archdeacon, Léon Serpollet, and Henri de Rothschild, recently met at dinner, and very naturally the conversation turned to aeronautics. After the subject of flight, with gravity as a propulsive force, had been discussed in many of its bearings, M. Henri de Rothschild, who is a sportsman *au bout des ongles*, at once recognised that flight with an aeroplane on these principles might be developed into a new sport, which, when people become expert at it, might compete very successfully with tobogganing, which it will probably most resemble. He at once undertook to offer a prize to encourage the pastime. We refer, of course, to free flight from the top of a moderate incline as practised by Lilienthal, Chanute, and the Brothers Wright, and it has been suggested that the neighbourhood of Berck or Merlimont might provide an admirable site for the development of the new recreation. It is just the thing, at any rate, to suit the Anglo-Saxon race, and it will have the advantage over tobogganing of developing man's mastery over what may be regarded as a new element Free flight may quite possibly develop into a very fine sport. Riskier than tobogganing as practised at St. Moritz and Davos-Platz it can hardly be, and it would probably appeal with particular force to Englishmen and Americans. The men who tear down the Klooster-Gang at Davos-Platz will probably have all the nerve and pluck required for the amusement. They will have the added satisfaction, if the pursuit becomes general, of knowing that they are really contributing to man's mastery over Nature. So far the number of people who have successfully practised gliding flight are few. The names of Lilienthal, Pilcher, Chanute, and the Brothers Wright practically exhaust the list. The first two were killed, after making a moderate number of successful glides. Chanute is still alive, having abandoned practical experiment, and the Wright Brothers, who have adopted a different principle from all their predecessors, alone remain. So the new sport, if ever carried out on a large scale, will provide all the risk that the most daring tobogganist could possibly desire—and more. The institution of a prize for any pursuit always stimulates competition quite out of all proportion to the value of the prize offered. It seems to focus effort, like the crown of wild olive of ancient days, which was worth practically nothing in itself. So let us hope that the prize which M. Henri de Rothschild has offered for gliding flight will have a distinct effect in concentrating attention on the new sport, and inducing a number of plucky *dilettantes*, who now more or less waste their time, to adopt an amusement which cannot fail to provide valuable data for developing the science and art of aeronautics in the future.

THE 1904 GERMAIN PETROL CARS.

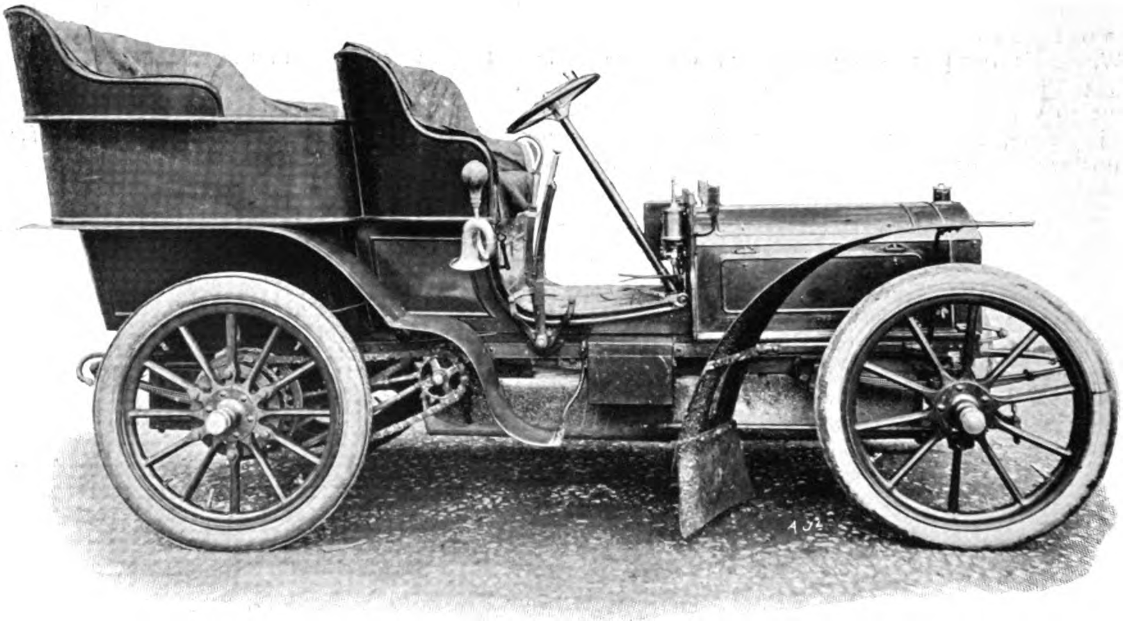

FIG. 1.—A 16-h.p. Germain Petrol Car.

THE Germain Company, who are one of the most progressive automobile manufacturers in Belgium, have not only considerably modified and improved their standard cars this year, but are also introducing a vehicle fitted with a two-stroke motor developed by them. Their ordinary standard vehicles, with 4-cylinder engines, are now made in three sizes, nominally of 16, 24, and 35-h.p. respectively. They are all of similar general construction, and we have recently had an opportunity of examining a 16-h.p. vehicle, from which our photographs were taken, and of which the following is a description:—

The special features of the Germain standard cars are that the engines have steel cylinders which are turned out of the solid, that brass water jackets are fitted to them in such a way that tight joints are ensured without recourse to soldering, that the crank-shaft, which is made of nickel-steel, has hollow crank-pins, through which the oil is forced into the connecting-rod bearings, that the mechanically-operated inlet-valves are arranged in such a manner that they can be allowed to close earlier or later during the suction stroke, that two forms of high-tension ignition are employed, and that the gear-box has a three-point suspension, and is self-aligning. The cars are also fitted with the Company's automatic carburettor, to which previous reference has been made in our columns, and the fan for drawing the air through the honeycomb radiator in front is arranged inside the clutch and the flywheel.

We were particularly struck with the silent working and smooth running of the car which we examined, and have no hesitation in saying that it is extremely difficult for the casual observer to determine whether the engine is running or not, when the car is standing still. Under such circumstances, and when the engine is running at a comparatively low speed, hardly any sound can be detected, and apparently there is no motion or vibration of any kind. Not only is the exhaust unusually well-silenced, but the closely-fitting bonnet, and the casing beneath the engine and the gear-box, effectually muffle what clicking sounds there may be from the operation of the valves. When travelling, too, the long springs and long wheel-base ensure a very easy movement, and the mechanism giving a variable lift to the inlet-valves allows the speed of the car to be varied with great rapidity.

This vehicle, which is shown in Fig. 1, has an armoured wood frame, which is reinforced by steel girders. The engine is carried on an under frame, having an angle section, and the gear box is attached direct to the main-frame. The axles are solid forgings, having an **H** cross-section, and the road wheels, which are shod with 915 by 105 m m. pneumatic tyres, are mounted upon plain bearings. The rear-wheels on this particular vehicle are provided with Samson non-skid leather bands, for which the English representative of the Germain Co., Capt. Masui, has the sole agency in this country. The frame is carried on long Lemoine side-springs, and is built low, this being permitted by arranging the second-motion-shaft in the gear-box slightly to one side of—instead of immediately above—the first-motion-shaft. The wheel-base of the standard car is 7 ft. 9½ in., though this is increased to 9 ft. 3 in. on chassis built to suit bodies having side entrances to the rear seats. The track is 4 ft. 6 in., the front axle is bifurcated at each end to carry the steering heads, and the standard body has a tonneau with seats for three passengers.

The engine, which is entirely enclosed beneath a flexible bonnet, connecting the honeycomb radiator with the dash, and by a sheet metal casing extending back below the gear-box underneath, is shown in Figs. 2, 3, and 4, Fig. 2 being taken from the right side and Figs.

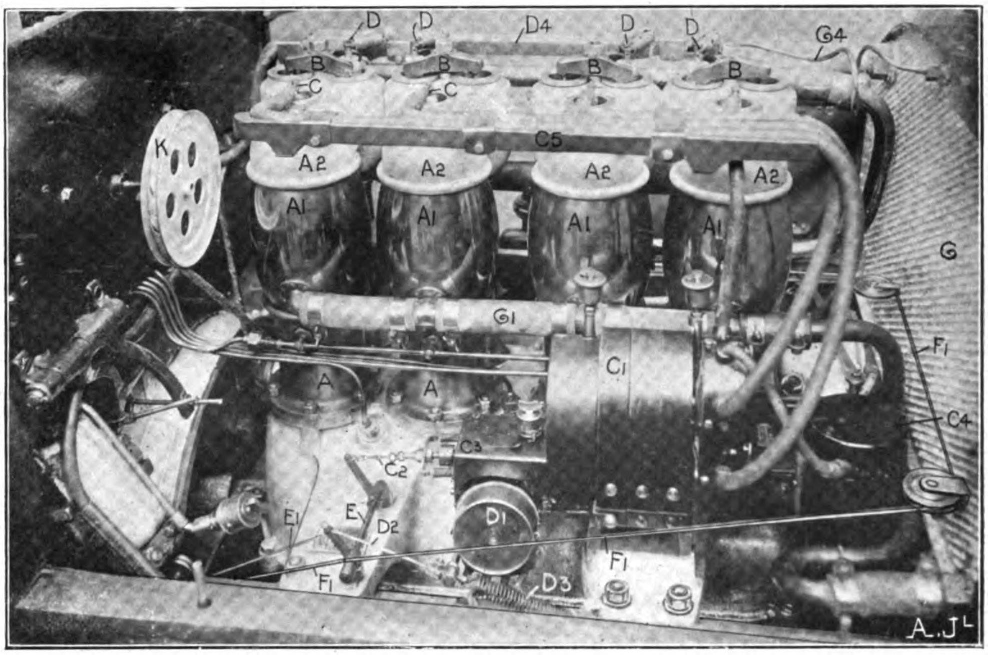

Fig. 2.—The Engine on the 16-h.p. Germain Car from the right-hand side.

3 and 4 from the left; it is also shown sectionally in Fig. 5. The four cylinders, A, are made of a special steel, and are each turned out of a solid bar; they are bored out to a slight taper inside, being one hundredth of a millimeter larger at the mouth than at the other end. The heads, A^2, are water-jacketed castings, which are held in place by four studs, and make a watertight joint between the brass jackets, A^1, around the cylinders and themselves. The lower ends of the jackets, A^1, are securely fixed to the cylinders by rings, which are shrunk on in place about them in a special manner. These rings have to be heated while they are round the cylinder, and the cylinder itself is, during the operation, kept cool by water inside it. The cylinder-head provides a common valve-chamber for the inlet and exhaust valves which lie alongside one another, and are operated in much the usual way from a single cam-shaft enclosed in the aluminium crank-chamber. High tension ignition plugs, C, are fitted centrally into the heads, A^2, and similar plugs, D, are also provided in the inspection covers which lie immediately above the inlet-valves. The inspection covers above the two valves of each cylinder are held down by a single nut and a yoke, B, so

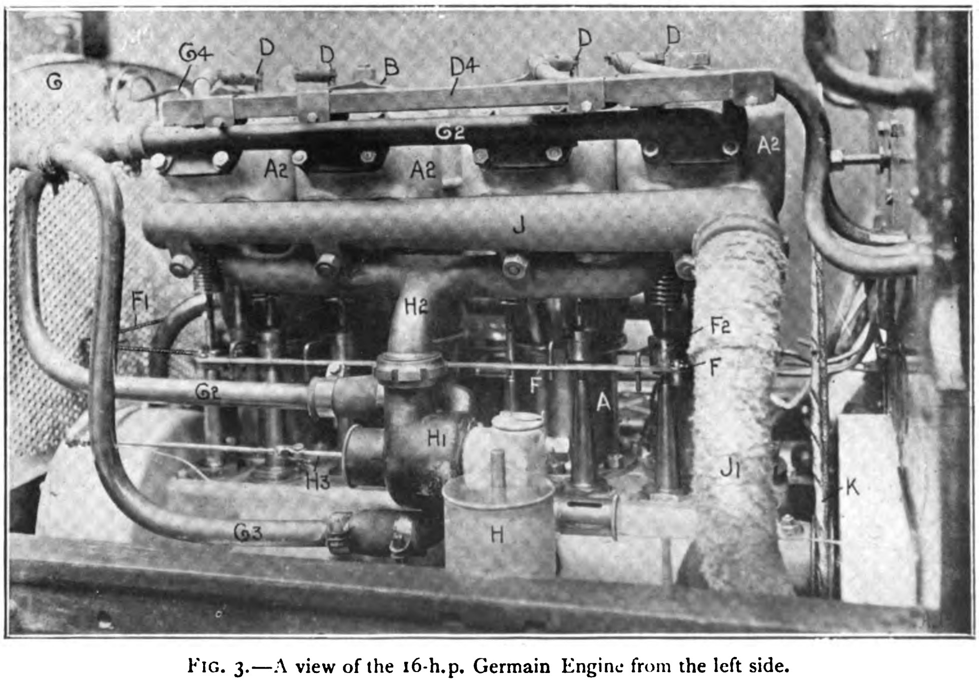

Fig. 3.—A view of the 16-h.p. Germain Engine from the left side.

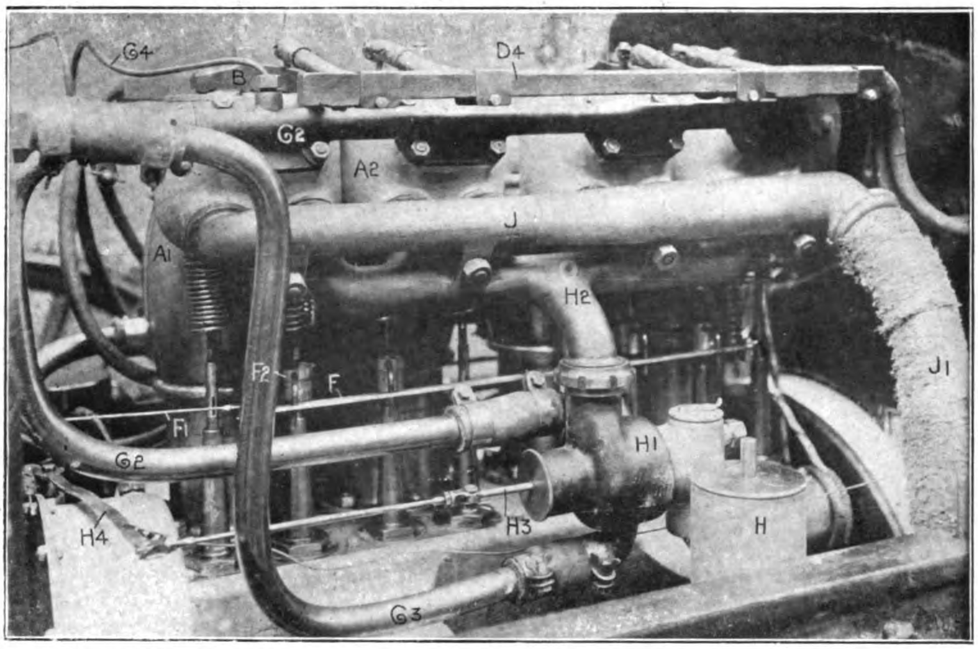

Fig. 4.—Another view of the 16-h.p. Germain Engine from the left.

that they are easily removed when it is necessary to attain access to the valves. The pistons are made of cast steel, which are fitted with cast-iron rings, and the valves are made of nickel steel. The cylinders have flanges formed at their lower ends by which they are bolted to the upper half of the aluminium crank chamber. The nickel steel crank-shaft is made from a solid forging, and is carried in three long bearings. The hollow crank-pins are arranged in conjunction with oil scoops in such a way that the oil is caught up by the scoops and is thrown by centrifugal force into the pins, through which holes are drilled for the oil to find its way to the big-end bearings of the connecting rods.

The gear-wheels driving the cam-shaft are entirely enclosed, and that on the front end of the cam-shaft is fitted with a centrifugal governor, which acts upon the throttle-valve, maintaining a normal engine-speed of 800 revolutions per minute, unless cut out of action by the driver depressing the accelerator pedal. The cam-shaft is fitted centrally with a gear-wheel which, meshing with a similar wheel on a shaft passing across the crank-chamber, drives the commutator, D^1, of the ordinary high-tension electric ignition on the opposite of the engine. The commutator is mounted on the extreme end of the shaft, and the same shaft drives the Eisemann high-tension magneto, C^1, which is fixed to the crank-chamber near the commutator. The magneto is driven by gearing off this transverse shaft, the gear being inside the casing, C^3, which is clearly visible in Fig. 2. The commutator, D^1, is employed in conjunction with the usual accumulators and trembler-coils, which are connected with the ignition plugs, D, the high-tension wires from the coils being led to the plugs through the wooden casing, D^4.

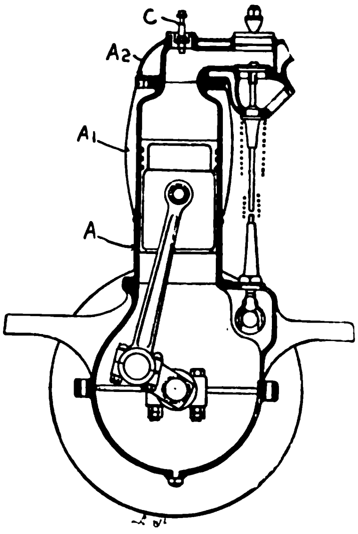

Fig. 5.—Cross section through one of the Cylinders on the 16-h.p. Germain Engine.

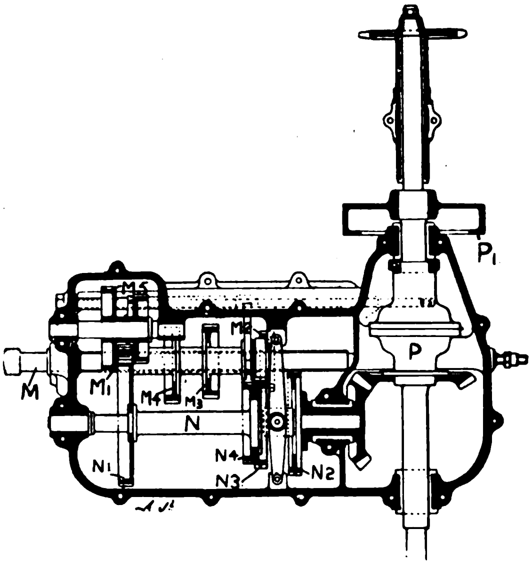

Fig. 6.—The Germain Change-speed-gear.

The Eisemann magneto, C^1, in conjunction with its coils, C^4, supplies the necessary high-tension current for the ignition plug C, the wires to which are laid in the casing, C^5. The time of ignition is simultaneously varied for both systems from a hand-lever placed above the steering-wheel, this lever being connected, by the steel cable, E^1, with a rocking-shaft, E, seen in Fig. 2. The rocking-shaft, E, is connected by the chain, C^2, with a magneto, and by the cable, D^2, with the commutator, so that the ignition is advanced or retarded at the same time for each; the spring, D^3, normally holds the commutator in its late firing position, and similar springs act in the same way for the magneto.

The lift of the inlet-valves is varied by a similar hand-lever above the steering wheel to that which times the ignition, a steel cable, F^1, running over pulleys on the radiator, G, connecting it with a steel bar, F, which engages with four collars, F^2, forming a part of the push-rods which operate these valves. The collars, F^2, screw over the ends of the push-rods, so that as they are caused to rotate through the arc of a circle, in one direction or the other, they elongate or shorten the effective length of the push-rod, and consequently allow for more or less free play between it and the valve-spindle. The collars, F^2, engage with the rod, F, by bent arms, which pass through holes in it and allow for the reciprocating movement of the push-rods. This mechanism is well seen in Figs. 3 and 4.

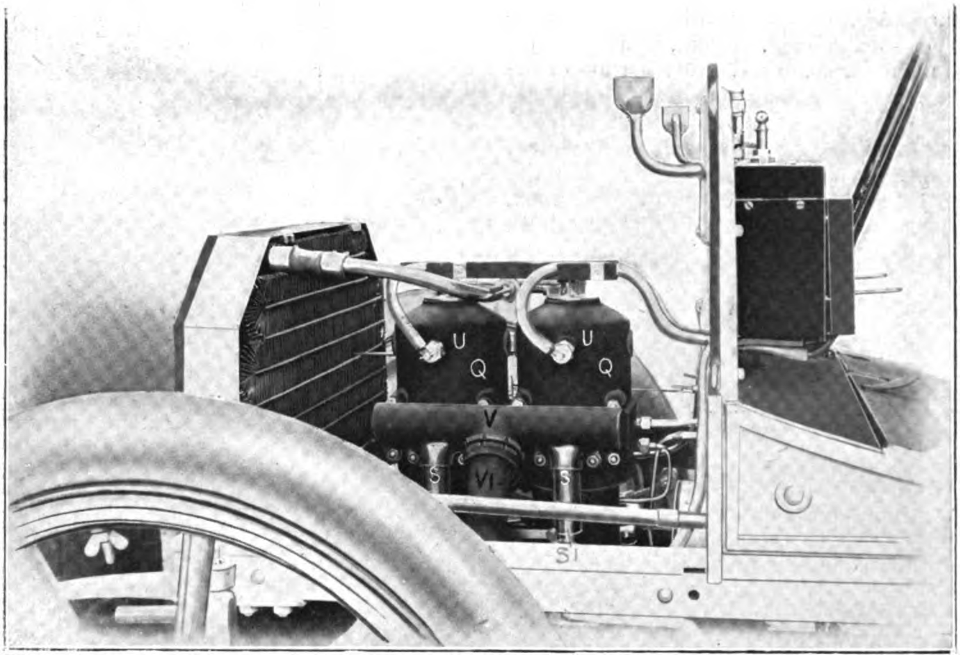

Fig. 7.—A Two-stroke Hardt Petrol Engine fixed in place on a Germain Car.

The carburettor is mounted on the left side of the engine, and is constructed on somewhat the same lines as the Krebs carburettor. The mixing-chamber, H^1, which is connected with the float-feed-chamber, H, is water-jacketed, the whole of the cooling water being led to it, from the jackets around the cylinder heads, by the pipe, G^2, and back from it to the radiator, G, by the pipe, G^3. The mixing-chamber contains the throttle-valve, the rod, H^3, of which is clearly seen in the illustrations, and is connected by the pivoted-lever, H^4, with the governor. The admission of auxiliary air to the carburettor is automatically controlled by a plunger, which is drawn down against the action of a spring by the suction in the mixing-chamber, and the explosive mixture is led to all four cylinders by the branched pipe, H^2.

The water is circulated through the jackets and the carburettor by a centrifugal pump, which is driven by gearing from the engine, the gear-wheel on its spindle being enclosed in the crank-chamber. It forces the water into the bottom of each of the brass jackets, A^1, through the pipe, G^1, and the water returns to the top of the radiator through the carburettor, as we have already said. In the event of the pump failing to work, the water would still circulate through the jackets on the thermo-syphon system, to ensure which a steam vent-pipe, G^4, is fitted between the large pipe, G^2, and the top of the radiator, as seen. The radiator has a capacity of about two gallons, and the pump runs at a speed of 1,800 revs. per min. when the engine is running at 800 revs. per min. We understand that a new form of radiator is now being fitted by the makers on the latest models, and that in it zig-zag baffles are arranged, so that the water, after entering at the bottom, travels up around the baffles to the top, and then returns down on the other side of them to the bottom; the external pipe fittings are in consequence rendered shorter and more direct; a slight alteration, too, is being made in the position of the pump to render it even more accessible than it is, and the position of the coil, C^4, is being changed for this purpose. The exhaust gases are led from all four cylinders into the pipe fitting, J, from which a single pipe, J^1, passes to the exhaust-box. The engine is fed with oil through pipes from a mechanical lubricator on the dash, this lubricator being driven by a belt, K, from a pulley on the rear end of the cam-shaft. One of the feed-pipes leads to all four cylinders, and the others pass to the various portions of the crank-chamber. A hand-pump is also provided for forcing oil to the engine when necessary.

The cylinders have a bore of 95 mm., and the stroke is 130 mm. At a speed of 850 revs. per min. the engine develops about 18-b.h.p.; its useful range of speed is from 100 to 1,200 revs. per min., and each engine is tested on the bench, running regularly under load, at a speed of about 90 revs. per min. The speed of the engine is, in practice, controlled by the two hand-levers above the steering wheel, for regulating the lift of the inlet-valves and varying the time of ignition respectively; when a greater speed than that allowed by the governor is required, the accelerator pedal is depressed.

The main clutch is of the cone type, and the arms of the internal cone member form fan blades in addition to those constituting the spokes of the fly-wheel. We are told that this was found necessary in practice, and that when the fan was formed in the fly-wheel only, a very ineffective draught was induced by it.

The arrangement of the change-speed-gear is shown in Fig. 6, where it will be noticed that the first-motion-shaft, M, carries four sliding spur-wheels, M^1, M^2, M^3, and M^4, which correspond with the wheels, N^1, N^2, N^3, N^4, on the second-motion-shaft, N, and that a pair of intermediate gear-weeels, M^5, are provided for giving the "reverse." The gear-box is fixed, in front, to a transverse member of the main frame, and the rear portion of the box is carried by self-aligning bearings beneath the side members of the frame. A universal joint is fitted between the first-motion-shaft and the main clutch, and a brake drum, P^1, is fixed in the usual way to the shell of the differential gear, P, close up to the gear box. The shafts in the gear box are mounted in plain bearings, but ball-bearings are fitted to take the end thrust of the bevel wheel. The gear wheels are made of nickel steel and are case-hardened. The entire mechanism runs in oil, and the bearings are fed with grease, through two pipes leading from a lubricator on the dash. Three large inspection covers are fitted, all of which are very easily removed. A single side-lever gives all four forward speeds and the "reverse."

The usual brakes are provided, all of them having metal-to-metal friction surfaces; the side-brakes in future models are to be of the internal type. Both the hand and the foot-brakes are connected with the main clutch, and an ordinary sprag is provided.

The Two-stroke Engines.

The two-stroke motors made by the Germain Company, a two-cylinder model of which is seen fitted to a car in Fig. 7, are known in Belgium as the Hardt engine. Their construction is clearly shown in Fig. 8, the special feature being that a scavenging charge of air is admitted to the cylinder before the fresh charge of combustible mixture is forced in. The cylinder, Q, has its upper portion water-jacketed, and it is constructed with four ports in addition to the ordinary exhaust ports, which are not shown in the sections but are uncovered by the piston just before it reaches the end of its down-stroke, as in most engines of this kind. The explosive charge is drawn into the crank-chamber, R, when the piston has nearly completed its upward stroke, after it has created a vacuum in the crank-chamber. At the same time that communication is established between the carburettor, R^1, and the crank-chamber, R, a pocket, T^2, in the piston connects the ports, Q^1 and Q^2, in the cylinder together, allowing air to flow into the pipe-fitting, S, which connects the port, Q^1, with the lower port, Q^2; the result is that, at the same time that the fresh charge is entering the crank-chamber, the pipe-fitting, S, is being filled with fresh air. As the piston, T, descends, it first covers the ports, Q^1 and Q^3, and then compresses the charge in the crank-chamber, R, and the air in the pipe-fitting, S. When nearing the bottom of its stroke it uncovers the exhaust-ports, and a moment later it uncovers the port, Q^1, opening communication between the crank-chamber and the upper part of the cylinder. The air in the pipe-fitting, S, is first forced into the cylinder, sweeping out the products of combustion before the combustible mixture finds its way into the cylinder, the baffle-plate, T^1, being fitted above the piston to assist the scavenging action as usual. Anything following the burnt gases out through the exhaust-ports will be pure air instead of combustible mixture, and consequently the engine is rendered more economical than are most two-cycle machines. During the upward stroke of the piston the combustible mixture is compressed as in other engines, and is ignited by the high-tension spark-plugs, U. Another advantage which is claimed for the engine is that there is very little chance of the fresh charge becoming ignited by the remaining hot gases in the cylinder.

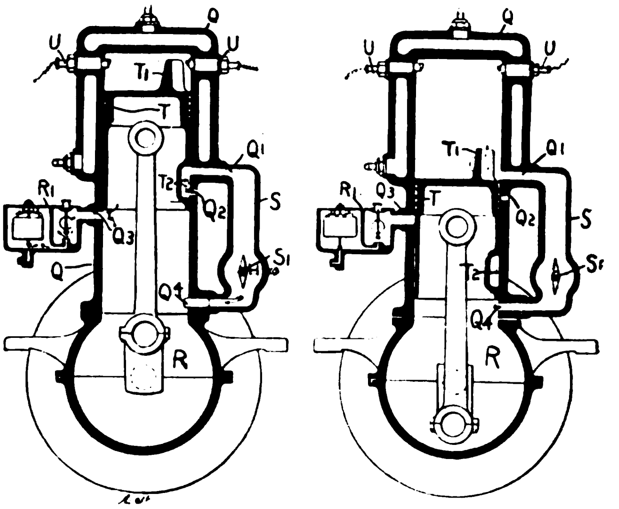

FIG. 8.—Two diagrammatic views of the Hardt Two-stroke Engine, showing the Piston at each end of its stroke.

The power of the Hardt engine is regulated by a throttle valve, S^1, in the pipe fitting, S, this valve regulating the volume of the charge forced into the working cylinder. The two-cylinder engine, shown in Fig. 7, which has a bore of 105 mm. and a stroke of 120 mm., develops about 15-b.h.p. at 1,500 revs. per min. It is not fitted with an automatic governor, but its normal speed is 900 revs. per min., and it is capable of doing useful work at any speed between 250 and 1,500 revs. per min. The exhaust gases escape through a series of holes passing through the walls of the cylinder into a port formed in the casting, and are led by the pipe-fitting, V (Fig. 7), into the central exhaust pipe, V.

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A PUBLIC service of automobiles is to be instituted in New Caledonia by the General Council of this French Colony. The route which will be covered is between Noumea and Bourail, a distance of 172 kiloms., and three 24-h.p. Turgan-Foy petrol omnibuses will be employed for the purpose. These have been specially constructed with a view to the peculiar nature of the country to be traversed.

THE 1904 ACHILLES PETROL CARS.

THERE is nothing of startling novelty about the cars which are being built by the firm of B. Thompson and Co., Limited, in the extremely ancient, though unusually busy and progressive little town of Frome, in Somersetshire, but they have the merit of being constructed entirely in English works, and in a very substantial manner. The Achilles cars are intended for the much-talked-of "man of moderate means," and the models already introduced vary in price between £145 and £300, which includes all such necessary accessories as lamps, horns, and a kit of tools. Although the Company have comparatively small works, they are very well equipped with thoroughly up-to-date machinery, and are laid out in such a manner that, with but few exceptions, every part is made throughout the premises. Their foundry enables them to make their own iron, brass, and aluminium castings, so that they only have to go outside for the steel castings, which figure somewhat prominently on the cars. They build their own frames, make their own engines, gear-boxes, axles, and steering gear; and the bodies, complete with the necessary upholstery, are constructed in their own shops; in fact, the only important portions of the car which they buy are the artillery wheels, and, of course, the tyres and minor accessories.

The present types consist of four single-cylinder models, the engines on which are of the De Dion high-speed pattern. The 6-h.p. car has two speeds and a reverse, the bore and stroke of the engine being 90 by 110 mm. The 8-h.p. vehicles, built either with long or short chassis, are provided with three speeds and a reverse, and the size of the cylinder is 100 by 110 mm. This model is supplied as a two-seater, a three-seater with a spider at the back, or a four-seater with tonneau. The 9-h.p. car is fitted either as a tonneau or as a double phaeton; it, too, has three forward speeds and a reverse, and the dimensions of the cylinder are 100 by 120 mm. The 12-h.p. model has a twin-cylinder engine, is also of the live-axle type, and in general respects follows the same type of construction as the smaller cars.

The accompanying illustrations refer more particularly to the 8 and 9-h.p. Achilles vehicles, Fig. 1 being a side view of an 8-h.p. car, which we have recently had an opportunity of giving a short practical trial at Frome, and Figs. 2 and 3 being views from above and beneath respectively of a complete 9-h.p. chassis. The car proved itself to be an uncommonly good hill-climber, and is apparently thoroughly well suited for those requiring a substantial little machine for general all-round work. We understand that it had already run many hundreds of miles without giving any trouble whatever, and it certainly did not show any signs of suffering in any way from wear or tear.

In general respects the arrangement of parts is the same as in the majority of up-to-date European voiturettes, but the cars possess the following special features, apart from their substantial nature, already alluded to. The engine and the gear-box are carried upon a detachable underframe which is interchangeable in cars of the same type, so that these two portions of the mechanism can be removed bodily. The main clutch is of the internal cone type, and has small flat springs introduced between the inner cone and its leather face, thus rendering it "soft" in its action. The change-speed-gear gives a direct-through-drive to the bevel on the back-axle, when the top speed is in use, and none of the meshing gear-wheels in the box are then in motion. The shafts in the gear-box run in hardened steel bearings, and the wheels with which they are fitted are made of forged steel, and are hardened after the teeth are cut. Very simple universal joints are employed for the propeller shaft, and the short shaft, on which the smaller bevel is mounted on the live axle, is supported in bearings on both sides of the wheel. The rear axle itself has a differential gear of the spur-wheel type, and although it runs on ball-bearings which are adjustable, plain bearings are also fitted to prevent any serious damage being done

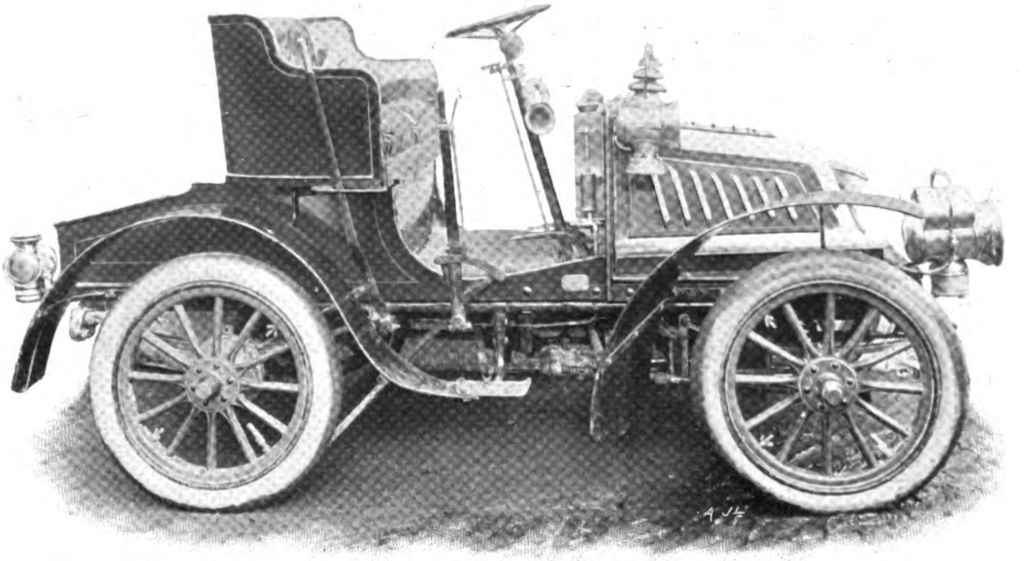


FIG. 1.—An 8-h.p. Achilles Petrol Car.

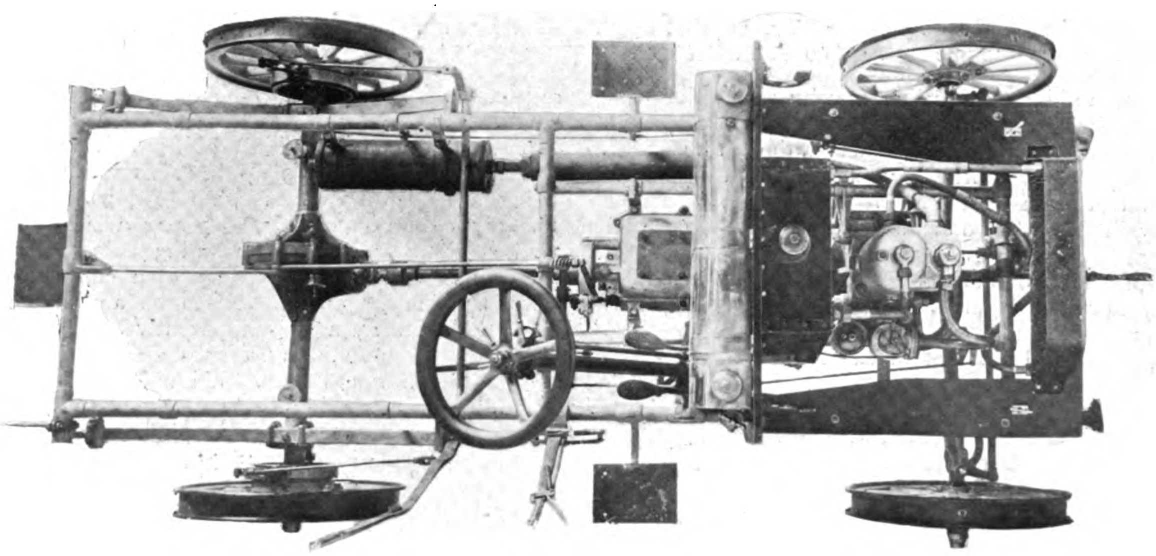


FIG. 2.—View of a 9-h.p. Achilles Chassis from above.

should a ball break. All the brackets on the frame are made of cast steel, and these are, for the most part, held in place by being pinned and brazed, others being self-aligning and clipped securely to the tubes. The engine is controlled entirely by hand, and its power is chiefly regulated by allowing the exhaust-valve to remain closed for a greater or longer period during the cycle. The time of ignition is also varied in the usual way, and a trembler-coil is employed to render easier the starting of the engine. A large double exhaust-box is fitted, the gases first passing into an expansion-chamber before they are led into the silencer proper. It should also be added that the brakes have metal-to-metal friction surfaces, and are all double-acting.

Very thick tubes are used for constructing the main-frame, the shape of which is well seen in Figs. 2 and 3. The underframe is formed of two similar tubes, to which the engine and the gear-box are attached by clipped drop-brackets. Steel rods, threaded at each end, pass through these tubes, and are fitted with nuts and collars at each end, by which the underframe is fixed to brackets on the front and central cross members of the main-frame; the brackets are slotted on the underside, as seen in Fig. 3, for facilitating the removal of the underframe when necessary. In the chassis illustrated, the side members of the frame are stiffened by rods and struts on the underside, but this additional stiffening is only employed when specially ordered. The frame is carried on the usual side springs above the tubular axles, and the rear axle is tied to the frame centrally by rods passing, fore and aft, from the casing surrounding the differential gear; short helical cushion springs are introduced between these rods and the cross members of the frame to which they are attached. The front axle is slightly bent, the steering heads at each end have plain-bearing surfaces lubricated by small helmet lubricators through the hollow pins, and the front wheels run on plain bearings.

The standard steering-gear is of the rack and pinion type, although an irreversible worm and worm-wheel

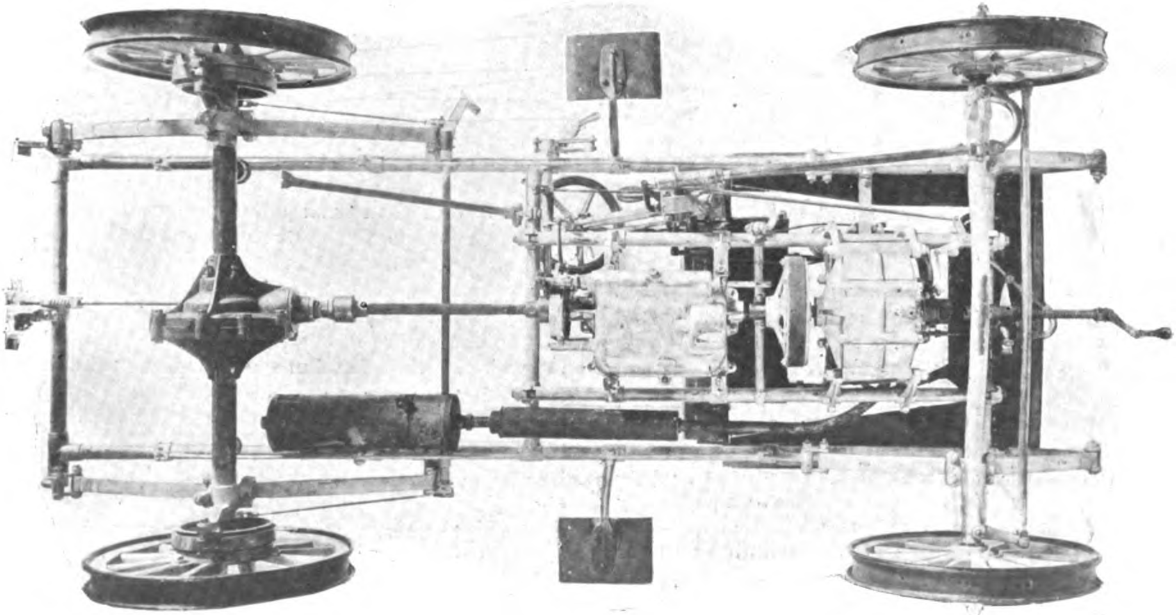


FIG. 3.—View of a 9-h.p. Achilles Chassis from beneath.

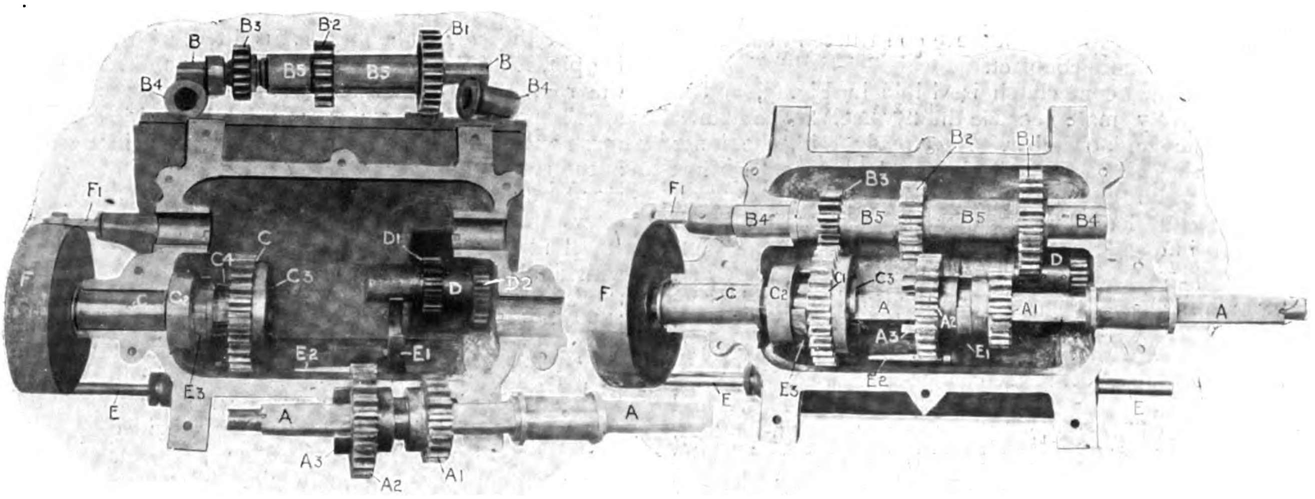


FIG. 4.—The Change-speed-gear on the Achilles 8-h.p. Cars. Shown with Cover removed, and also with Driving and Lay Shafts removed.

gear can be substituted (as seen in Fig. 3), if desired. In either case, an adjustment is provided for taking up back-lash, and the tubes connecting the gear with the steering heads are amply strong for their work. The road wheels are of the artillery type, and all four have twelve spokes. They are adapted for taking Michelin pneumatic tyres of the following sizes on the different types:—For the 6-h.p., 700 by 65 mm.; for the short chassis 8-h.p., 700 by 85 mm.; for the longer 8-h.p. chassis, and the 9-h.p. model, 750 by 85 mm.; and for the 12-h.p. car, 800 by 85 mm.

The engines do not call for any special description, as they closely resemble the well-known De Dion design; in fact, the actual engine seen in Figs. 2 and 3 is a genuine De Dion. The Company use nickel steel for their crankshafts, and are now building the crank-chamber in such a way that it also forms the body for the carburettor and the casing for the centrifugal pump. The half-speed gear, operating the exhaust-valve, is connected with one of four small levers on the steering-pillar, or in some cases with a foot-pedal instead, so that the length of time during which the valve remains open can be varied at will. This mechanism is also attached to the clutch and the brake-pedals, so that the engine is automatically slowed down when either of them is depressed. The other three levers on the pillar vary the time of ignition, and act upon the carburettor in the usual way. The carburettor is of the well-known Longuemare type, but is slightly modified; the needle, which cuts off the petrol-feed, is fixed direct to the float, so that as the float rises the needle is carried with it into the valve.

The cooling water is circulated through the cylinder-jacket by a pump, and is contained in a tank in front of the dash and in a radiator, which either forms the front of the bonnet (as in Figs. 2 and 3) or is arranged on a lower level as in Fig. 1. On the chassis, from which our photo is taken, the pump is fixed to the front of the frame, and is driven flexibly from the cam-shaft, but, as already indicated, it is to form a part of the crank-chamber, and will be gear-driven. The engine is lubricated by a small hand-pump on the dash, and the oil is carried in a small compartment of the large tank fixed behind the dashboard; the larger portion of this tank contains the petrol, of which about three gallons is carried on the smaller cars and four gallons on the larger.

The position of the double exhaust-box is well seen in our illustrations, and on this particular chassis the expansion chamber is connected by a short length of pipe with the silencer itself. In the boxes now being made,

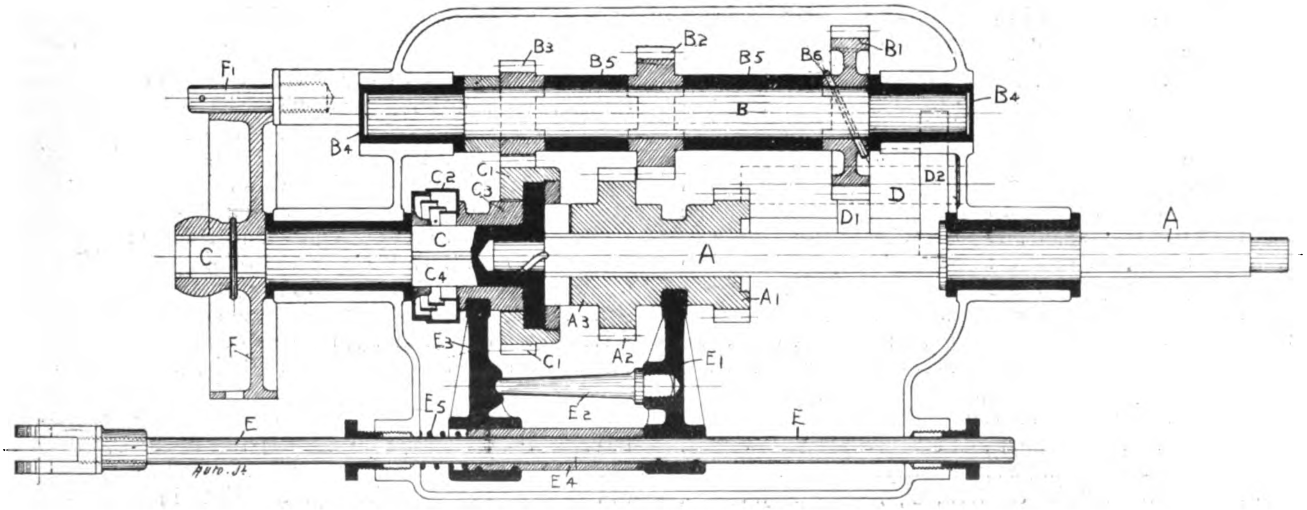


FIG. 5.—Sectional Drawing showing construction of the Achilles Change-speed-gear.

however, these two chambers are constructed in one, and are therefore more compact.

The internal cone clutch is visible in Fig. 3, and is comparatively small, because the flywheels are contained inside the crank-chamber. As already said, the inner member has a leather face, with small flat steel springs fitted beneath the leather. No end thrust is imposed on either of the shafts by the clutch, and the spring which holds it in engagement is arranged inside it; the foot-pedal operating it lies alongside the brake-pedal, and both of them are mounted upon the bracket carrying the steering gear. The internal cone member is free to slide on a square formed on the projecting end of the first-motion shaft, A, of the change-speed gear.

The change-speed gear is clearly shown in Figs. 4 and 5, where it will be noticed that the first-motion-shaft, A, terminates inside the short shaft, C, from which the propeller shaft passes to the live axle, and on which the brake-drum, F, is mounted. The shaft, A, is square inside the box, and carries the sliding spur-wheels, A^1 and A^2, together with the jaw-clutch members, A^3. The lay shaft, B, is fitted with three spur wheels, B^1, B^2, and B^3, either of which can separately be removed and replaced without difficulty. The wheel, B^1, is pinned to the shaft, B, by the pin, B^6, and the other wheels slide in place over the shaft, with the sleeves, B^5, between them. These sleeves have jaw-clutch members so that they connect the wheels, B^2 and B^3, rigidly with the wheel, B^1. The lay shaft, B, is carried at each end in hardened steel bushes, having solid ends, and the bearings for the shafts, A and, C, are also made of similar material. The wheels, A^1 and A^2, can be made to mesh respectively with the wheels, B^1 and B^2, to give the first and second forward speeds, and at this time, the wheel C^1, is rendered rigid with the shaft, C, by the sliding jaw clutch members, C^3, on the latter, which are pressed up in place by the spiral spring, C^4, lying inside the cap, C^2. The power is therefore transmitted from the lay shaft, B, to the shaft, C, through the gear wheels, B^3 and C^1. The sliding sleeve carrying the wheels, A^1 and A^2, is controlled by the fork, E^1, from the sliding rod, E, which is connected with the change-speed lever at the side of the car. The fork, E^1, is fitted with a projecting pin, E^2, which engages with another fork. E^3, when the rod, E, is moved rearwardly beyond the second speed position, in which the wheels, A^2 and B^2, mesh with one another. The fork, E^3, rides in a groove in the jaw-clutch member, C^3, so that when it is forced rearwardly by the action of the pin, E^2, upon it, it withdraws the jaw, C^3, from the wheel, C^1, rendering that wheel idle at the same time that the jaws, A^3, engage with similar jaws on the front end of the shaft, C. By this arrangement the lay-shaft, B, and the wheel, C^1, can remain stationary when the top-speed is in use. The fork, E^3, is fixed to a sleeve, E^4, which slides on the rod, E, and an additional spring, E^5, is introduced between it and the end of the gear-box, to assist the spiral spring, C^4. The reverse gear is provided by a pair of wheels, D^1 and D^2, fixed to a sleeve, D, which is free to revolve upon a stationary pin. The first of these wheels at all times meshes with the wheel, B^1, and the other is engaged by the wheel, A^1, when that wheel is moved to its most forward position by the hand-lever. The gear-box is usually made of brass, but aluminium is substituted if specified.

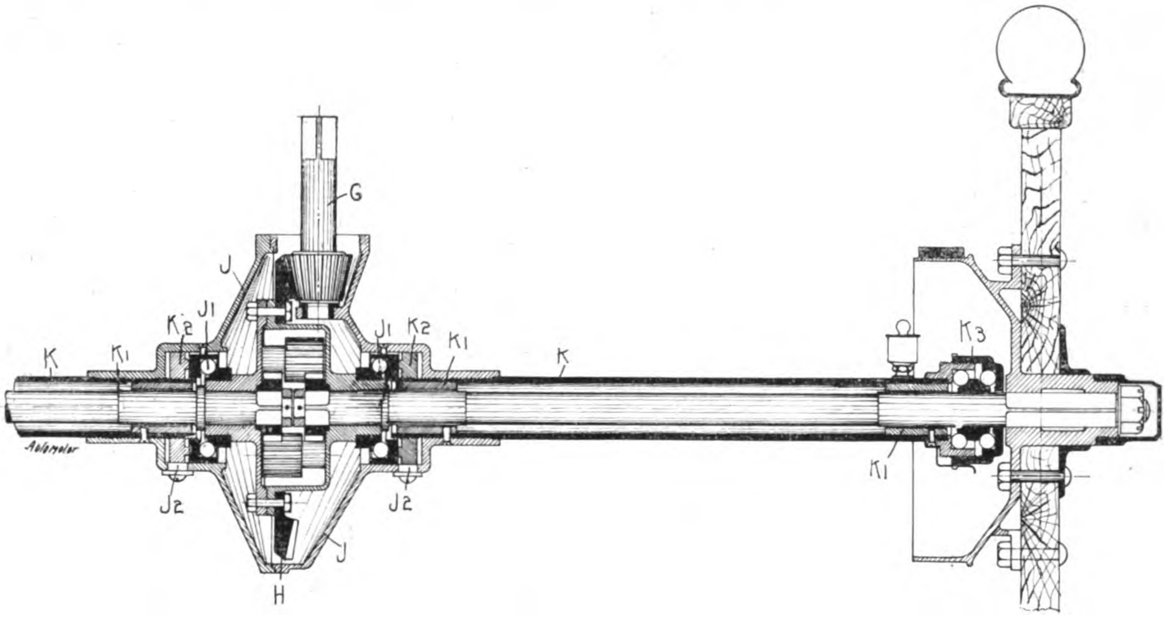


FIG. 6.—Sectional Drawing of the Achilles Back Axle, showing the Plain Bearings and the Adjustable Ball Bearings.

The power is transmitted from the shaft, C (Figs. 4 and 5), by a propeller shaft to the short shaft, G, shown in Fig. 6. The propeller shaft is provided with universal joints at either end, and the short shafts have a square section for receiving them. The universal joints themselves consist of small square blocks, which are rounded off and fit inside corresponding square sockets on the propeller shaft. The back axle, Fig. 6, is built up with two stationary tubes, K, which are screwed into and pinned to an oil-tight casing, J, surrounding the differential gear and the bevel wheels driving it. The casing, J, is made of two steel castings, but aluminium is substituted if desired. The inner ends of the tubes, K, are also screwed into the adjustable nuts, K^2, which serve to tighten up the ball bearings, J^1, inside the casing, J. The nuts, K^2, can be got at from outside by removing the small caps, J^2, and introducing a tommy through the slots in which they fit. The nut can thus be screwed up to the required extent, and the caps, J², themselves act as locking pins for the nuts. Sufficient adjustment is provided for these nuts to allow the size of the large bevel wheel, H, to be varied by one tooth, to alter the gear ratio, if necessary. The two halves of the live axle are carried in the plain bearings, K¹, inside the tubes, K, but the bushes are bored out with a slight clearance, so that they do not come into play unless the ball bearings fail. The ends of these shafts are carried in double ball bearings, which can be adjusted by the caps, K³, and locked when adjusted.

The foot-brake operates the brake-band which is carried by the pin, F⁵, on the gear-box, and is arranged so as to act equally well forwards as backwards. Similar brakes are fitted to the hubs of each of the rear wheels, and these are usually operated by a hand-lever, which lies outside the body beside the driver. In some cases, however, when so ordered, internal brakes can be fitted instead, and, if desired, the hand-lever can be placed alongside the change-speed-lever, instead of behind it. The friction surfaces are in all cases metal-to-metal, usually phosphor bronze on cast steel.

The bodies are made of specially selected wood, with aluminium panels, and will doubtless be examined by many of our readers at the forthcoming show at the Crystal Palace. They are tastefully finished, and the upholstery, which is for the most part carried out with the high-class leather prepared locally in Frome, is well calculated to prove extremely durable in ordinary use.

THE CROSSLEY PETROL ENGINE.

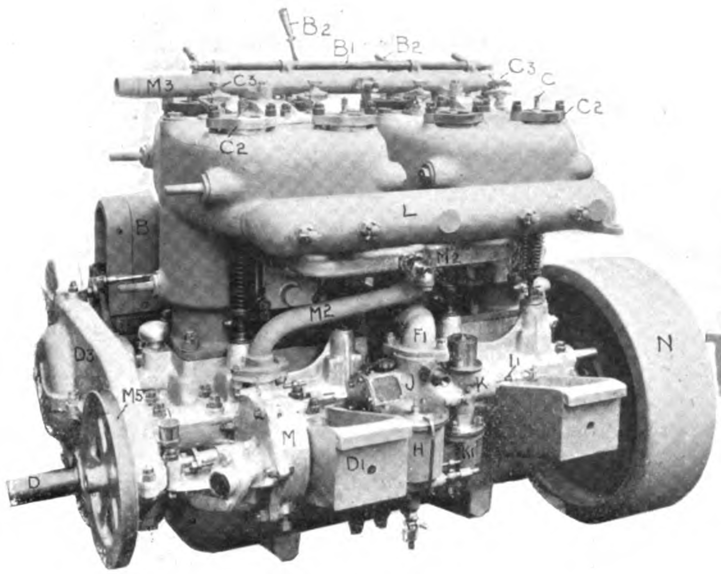
We have already given a brief general description of the engine—in our first article dealing with the Crossley car, but are now able to enter into details concerning its construction, with the assistance of the very complete illustrations which we have prepared. Figs. 1 to 4 are reproduced from photographs taken from each side, and from each end of the complete engine, whilst in Figs. 5 to 8, inclusive, transverse and longitudinal sections, together with an end elevation and a plan, are shown.

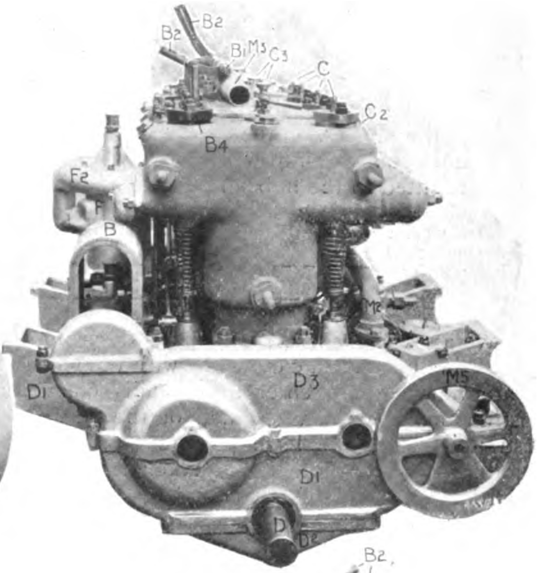
One of the complete cylinder castings is seen in Fig. 9, and a similar casting, cut open, in Figs. 10 and 11, so as to allow the size of the water-jacket, and the unusual distance to which it extends down the cylinder-wall, to be seen at a glance. Each of these castings, after having its external faces planed, is bolted down on the bed of a horizontal boring machine, in which one cylinder after the other is turned at a single setting—thus ensuring absolute parallelism of the two cylinders. The casting is then slid into a box jig, over projecting bosses in the base of which the mouths of the cylinder are bound to fit exactly, and all the further operations are performed upon the casting, through the steel-bushed holes in the jig itself which ensure accuracy of machining and interchangeability of each cylinder casting. It will be understood that the bosses in the base of the jig act as absolute templates, and prevent any casting in which the two cylinders are not at the correct distance away from one another from being fitted into the jig at all.

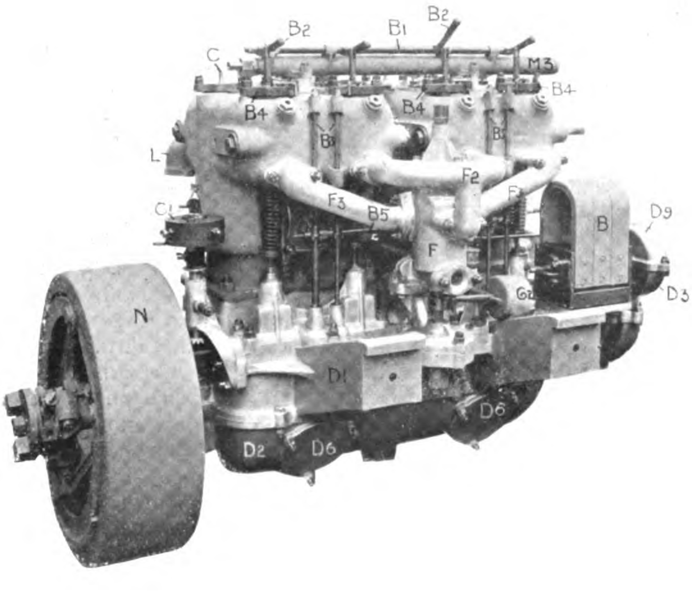
It will be noticed in Fig. 5 that the inlet-valves, A, and the exhaust-valves, A¹, have their seats arranged on a somewhat lower level than the port leading from them into the working cylinder, and that the gases therefore tend to pass more equally around them, instead of on the cylinder side only, this being particularly important for the exhaust-valves, because it reduces the tendency for the valve to be heated to a greater extent on the one side than the other. The inlet-valves are made of nickel-steel, and the exhaust-valves of the special bronze alloy to which we have previously referred. The induction pipes, F² and F³, as also the exhaust-pipe fitting, L, are fixed in place to the cylinder casting by studs and castle-nuts, and small rings, A², are inserted as liners to "break" the joints, and to act as register rings, which are more easy to renew than if they were formed by projections on either of the parts between which they lie. Each inlet-valve is rendered easily accessible for grinding in by removing the low-tension igniter, B⁴, which is fitted immediately above it, and a similarly-shaped inspection cover, C², lies above each exhaust-valve. These plugs are secured in place by a pair of studs passing through their flanges, but the actual joint between them and the cylinder-casting is not made on the surface of the latter, but by conical valve-like seatings on a lower level, as seen in Fig. 5. In the engine shown, high-tension ignition plugs, C, are screwed into the inspection covers, C², but this is not a standard practice, because it is not intended to fit a high-tension ignition system at all, unless specially ordered; an alternative position for the plugs is provided at A³, in the neighbourhood of the low-tension igniters, B⁴, and the inlet-valves, A. The water is led in at the bottom of the jackets on the right side, as seen in Fig. 1, by the branched pipe, M², and is forced out at the top into the pipe, M³, which passes across just above them. The chopper switches, B², which make contact with the insulated terminals of the igniters, B⁴, are carried upon an insulated rod, B¹, which is in turn supported by brackets projecting from the water pipe, M³. The igniters themselves do not call for any special comment, for their construction is well seen in Figs. 5 and 8. Half-compression cocks, C³, by which paraffin can be introduced into the cylinders to clean the rings, are mounted in much the usual way centrally in the cylinder heads. The cylinders and their pistons are made of very hard cast iron, and their exact shape is clearly shown in Figs. 5 and 6, where also the hollow gudgeon pins and the connecting rods are shown sectionally and in elevation. Mention has already been made of the special, concentric, hammered piston rings; these are indicated in Fig. 5, although we understand that four only are being actually used. The branched pipe, which feeds all four cylinders with oil through small, non-return ball-valves from the water-jacketed pressure lubricator on the dashboard, enters each cylinder at A⁴.

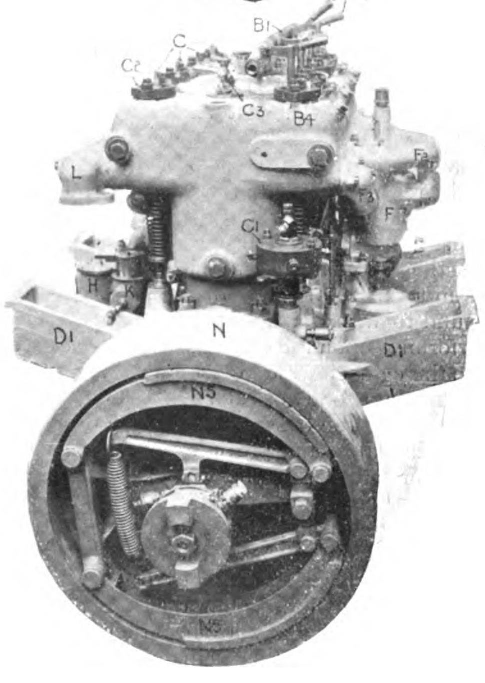
The aluminium crank-chamber is formed by two large castings, D¹ and D², the horizontal joint between which passes through the centre of the main bearings of the crank-shaft, D. The upper portion has four projecting feet by which the engine is securely bolted to the side members of the main frame, and the lower halves of the bearings for the cam-shaft are also formed in it. Separate castings, D⁷, constitute the upper halves of the cam-shaft bearings, and they also provide guides for the push-rods to slide in. These rods having unusually wide nickel-steel rollers resting against cams of equal width; the cams are not only keyed to their shafts, but are driven home in place with tapered surfaces between them and the shafts. The crank-chamber is so shaped that it encloses the lower portions of the gear-wheels driving the cam-shafts, and a separate casting, D^3, completes this casing. Each half of the base, D^2, of the crank-chamber receives small overflow pipes, D^4, which project up to the required level inside the chamber, and allow any surplus oil to be drained off; ordinary drain-cocks are also fitted at D^5 for completely emptying it when necessary, and inspection covers, D^6, are arranged for getting at the big ends of the connecting rods.

The crank-chamber provides three long bearings for the shaft, D, these having split brasses of a special alloy. Each of the bearings is lubricated by a ring, E^1, which circulates the oil over them from a trough in the base. The oil is led from the lubricator on the dash by two pipes to the end bearings, the pipes entering them at E. The oil finds its way from the bearings through holes, E^2, into each half of the base casting, and is caught up









FOUR VIEWS OF THE CROSSLEY PETROL ENGINE.

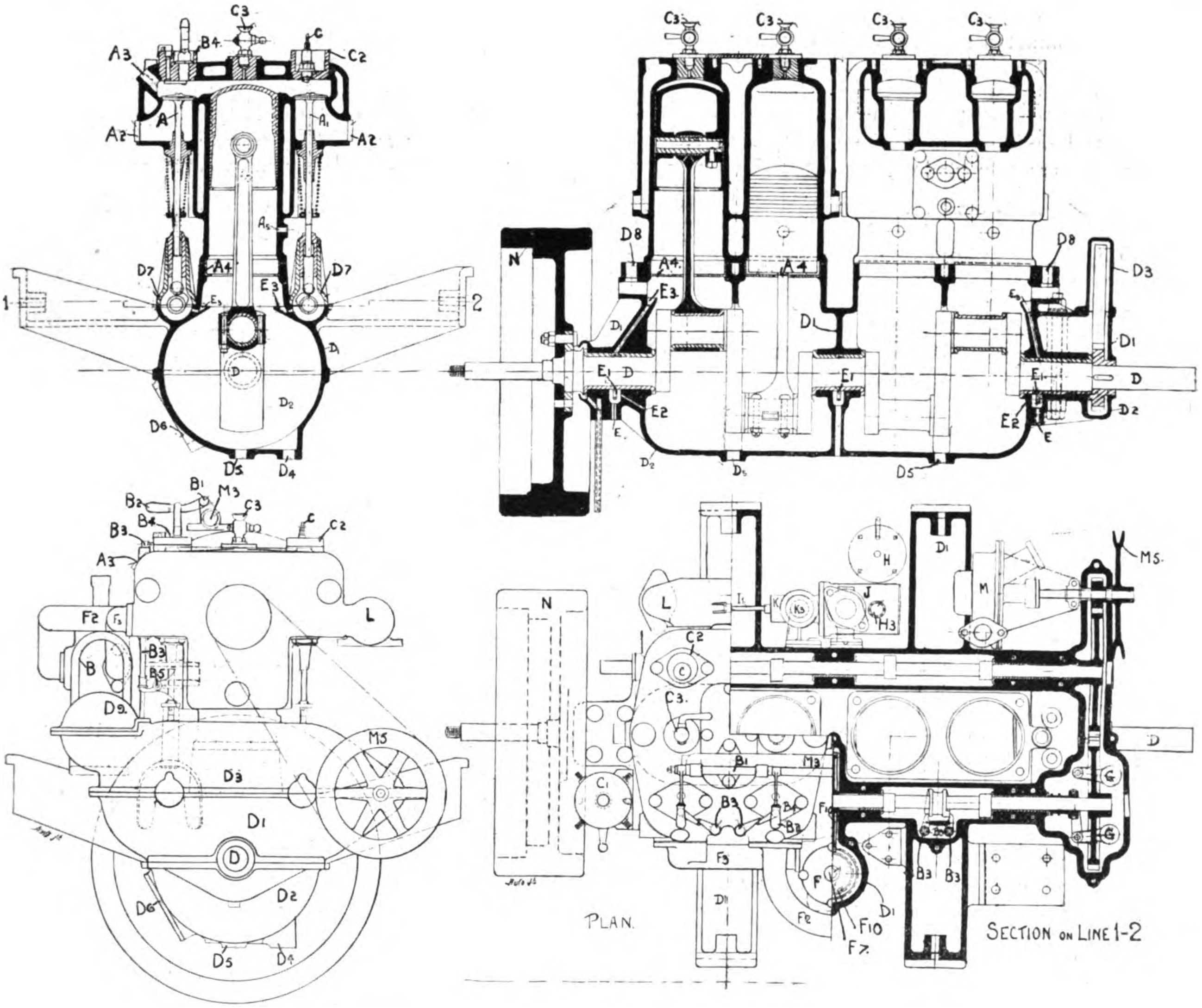
FIG. 1.—The left side, showing Pump, Carburettor, Exhaust-Valves, and High-tension Igniters.

FIG. 2.—The front end, showing Exhaust-Valves on the right and Inlet-Valves on the left.

FIG. 3.—The right side, showing Commutator, Low-tension Igniters, Cut-off Valve, and Magneto.

FIG. 4.—The back end, showing Low-tension Igniters above the Inlet-Valves on the right, High-tension Ignition Plugs above the Exhaust-Valves on the left and the Flywheel fitted with Expanding Clutch.

by the connecting rods when the engine is running, and is splashed up in the usual way. The splashed oil is caught in the ducts, E^3 (Figs. 5 and 6), which lead it back again to the main bearings, and also conduct it into the chambers surrounding the cam-shafts and the cams. The main bearing near the flywheel has an oil-catching ring arranged outside it, and this ring communicates with a drain-pipe as shown in Fig. 6, so that any oil which may find its way out along the shaft is prevented from creeping on to the flywheel, and being scattered promiscuously by it. Air-vents are provided for at D^6, at each end of the crank-chamber, and the oil is prevented from being thrown up too freely into the cylinder by the baffle plates, A^4, which also act as registering liners between the crank-chamber and the mouths of the cylinders, as shown.



FOUR DRAWINGS OF THE CROSSLEY PETROL ENGINE.

FIG. 5.—Vertical Cross Section through one of the Cylinders, with Exhaust-Valve on the right and Inlet-Valve on the left (as in Fig. 2).

FIG. 6.—Vertical Longitudinal Section through centre of Engine (corresponding with Fig. 3).

FIG. 7.—Front elevation (corresponding with Figs. 2 and 5).

FIG. 8.—Part Plan and part Horizontal Section through Cam-shaft.

The crank-shaft, D, which, like several other parts of the engine, is made of nickel steel, is machined all over from a forging. The shaft itself and the crank-pins are turned in such a way that no want of care whilst it is in the lathe can possibly spring it, and thus render it out of truth during the operation. Messrs. Crossley have adopted a special system, developed by them for their ordinary gas-engine crank-shafts, for this four-throw crank-shaft. The main feature of their system is that, whilst the crank-pins are being turned, the shaft is supported between the centres on the lathe by floating pins, which pass through the carriers at each end and therefore press direct upon the outer cheeks of the crank instead of tending to bend the shaft. Special distance pieces, which also act as accurate templates, are introduced between crank-cheek and crank-cheek in the line of thrust, so that during the whole operation the shaft is as free from bending strains as it is when it ultimately lies in its own bearings in the crank-chamber. This method of machining crank-shafts is so satisfactory that, even on the largest shafts made by this firm, they can guarantee absolute truth in every respect to about a thousandth of an inch. The flywheel, N, is fixed to the crank-shaft by bolts passing through a registering flange which forms a part of the solid forging; the wheel is about 18 inches in diameter, and the rim is about $5\frac{3}{4}$ inches wide.

The magneto, B, is bolted down to a bracket forming part of the crank-chamber casting, D^1, and it is driven at the same speed as the engine by a small spur-wheel, meshing with the larger wheel on the front end of the inlet cam-shaft; the upper portion of the small wheel is closed in by the cover, D^9. The igniters, B^4, are operated by the disc-cams, two of which are seen on the inlet cam-shaft in Fig. 8, these cams engaging with projecting arms mounted on the lower ends of the vertical rock-shafts, B^3. The arms on each pair of rocking-shafts, B^3, are held in contact with their cams by a helical spring connecting them together, these springs giving the quick "break" action required, the electrical circuit being completed by weaker springs on the igniters themselves. The time of ignition is varied by raising or lowering the rock-shafts, B^3, so that the cams actuate them earlier or later in the cycle of operations. The "timing" is actually effected by rocking the small horizontal shaft, B^5 (shown in Fig. 7), forked arms on which engage with small collars on the shafts, B^3.

When the ordinary high-tension system of ignition is also fitted, the commutator, C^1, is mounted on a vertical shaft, as shown, and is driven by a pair of bevel wheels from the rear end of the inlet cam-shaft; it is mounted in the usual way, so that the time of ignition can be varied, and it is used in conjunction with four coils and a battery of accumulators.

The governor, G, is shown in Fig. 8; it is fitted inside the large spur-wheel which drives the inlet cam-shaft. It is of the ordinary centrifugal type, and is, in the engine from which our photographs were taken, connected with the variable cut-off valve, F, so that it controls the volume of the explosive charges drawn into the working cylinders; in Fig. 3 it will be noticed that the weight of the valve itself is counterbalanced by an adjustable weight, G^2.

The circulating pump, M, which is of the centrifugal type and unusually large, is fixed to the crank-chamber on the opposite side of the magneto. It is driven somewhat faster than the engine by a spur-wheel meshing with the large wheel on the exhaust cam-shaft, and enclosed in the same casing with it. The pump is mounted sufficiently far behind the gear-case to allow the gland through which its spindle passes to be readily got at for packing, and the spindle projects forward through the gear-case carrying a grooved pulley, M^5, for driving the fan behind the radiator. Three studs project from the front cylinder-casting for carrying the fan, and it is so mounted that the tightness of the belt can be adjusted.

The bore of the cylinders is $4\frac{1}{4}$ in., and the stroke of the pistons is $5\frac{1}{8}$ in. A compression of approximately 75 lbs. per sq. in. is arranged for, and the engine develops about 28-b.h.p. at its normal speed of 900 revs. per min. It is capable of doing useful work at any speed between 80 and 1,200 revs. per min., this wide range being largely due to the special carburettor with which it is fitted, and to the employment of mechanically-operated inlet-valves. The studs, by which the various detachable parts are held in place, have a square cross-section, except at their threaded ends, and as the flanges which fit over them have corresponding square holes through them, it is impossible for a stud to be broken off in the casting, or to be screwed out of it, when tightening up or slackening the nut; a specially strong screw thread has also been adopted for all the studs, so that they are less likely than usual to have their threads stripped. The nuts employed are of the "castle" type, which permit split pins to be introduced for locking them, whatever their position may be, when they are tightened up.

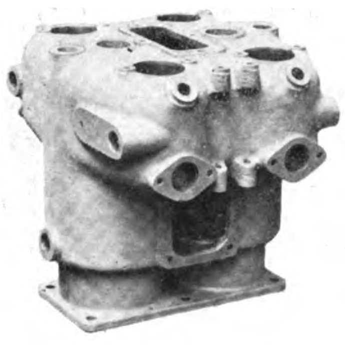


Fig. 9.—A complete Cylinder Casting.

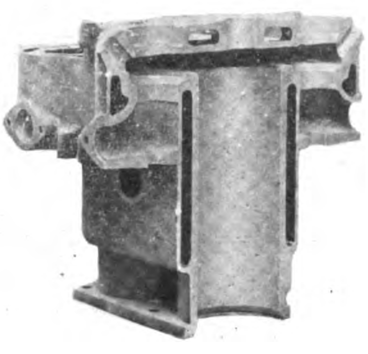


Fig. 10.—A similar Casting cut vertically through the centre of one Cylinder and its Valve Chamber.

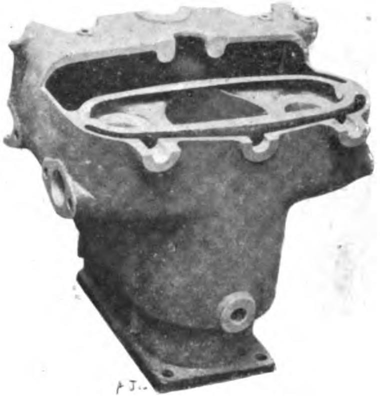


Fig. 11.—The same Casting cut horizontally through the Combustion and Valve Chambers.

A Society of Automobile Engineers has been founded in New York, the chief mission of the Society being the interchange of technical automobile knowledge among the members. At first, quarterly meetings are to be held, when papers will be read. Mr. A. L. Riker, of the Locomobile Company of America, has been elected President, the Vice-Presidents being Messrs. Henry Ford (Ford Motor Car Company) and John Wilkinson (Franklin Motor Car Company). Mr. E. T. Birdsall, of the Standard Automobile Company, will act as Secretary and Treasurer. There are to be two classes of members, viz., an active class for registered engineers and an associate class for members interested in automobile sale or construction who are not engineers.

THE AUTOMATIC CARBURETTOR ON THE CROSSLEY CAR.

As already briefly explained, the special feature of this carburettor is that a column of mercury is employed to enable a more accurate and positive action to be obtained, from the suction in the mixing chamber, upon the valve which controls the admission of the auxiliary air, and to thus regulate the richness of the explosive mixture supplied to the engine. The principle adopted for ensuring a constant richness of mixture (in spite of variations of engine speed and of the quantity of mixture drawn by the engine) is similar to that made use of in several other automatic carburettors described by us, amongst which the Krebs is, perhaps, the best known. It is unnecessary therefore to explain this principle at any length, and we need only remind our readers that it is the increased suction in the mixing chamber which tends, in an ordinary carburettor, to give too rich a mixture, and that in these automatic carburettors a valve, admitting diluting auxiliary air to the mixture formed in this chamber, is therefore arranged so as to be automatically controlled in accordance with the degree of suction, and to thus compensate automatically for such variations in richness.

In the previous automatic carburettors referred to, the auxiliary air-valve is connected with, or is formed by, a diaphragm or a piston, which is mounted in a portion of the mixing chamber itself, or in another chamber which is in open communication with it. The piston, or the diaphragm, as the case may be, has its one face open to the mixing chamber, and its other face exposed to the atmosphere, so that as the pressure (or, as the French more correctly call it, the depressure) in the mixing chamber is reduced below that of the atmosphere, the atmospheric pressure is caused to open the auxiliary air ports. It will be noticed that in these carburettors the actual degree of vacuum in the entire chamber acts upon the valve, and that a spring is required to hold the

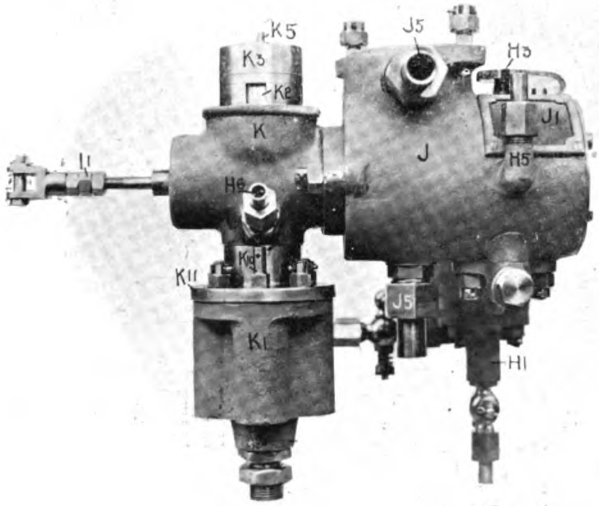


FIG. 1.—Rear view of the Automatic Carburettor, showing the Water-jacketted Mixing-chamber, the Auxiliary Air-valve, the Throttle-valve, and the Mercury Chamber.

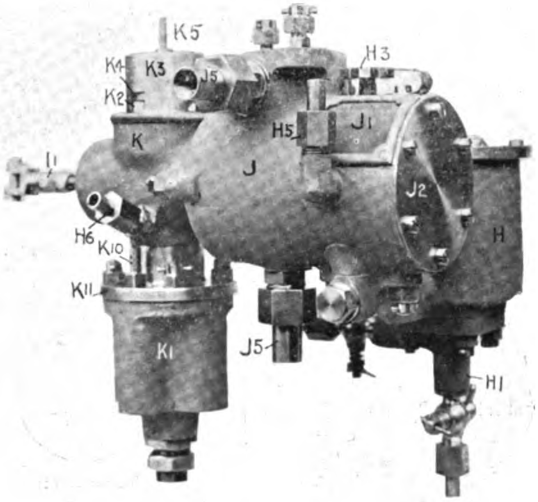


FIG. 2.—Diagonal View of the Automatic Carburettor in which the Cover Plate, J^2, and the Float-feed Chamber, H, are visible.

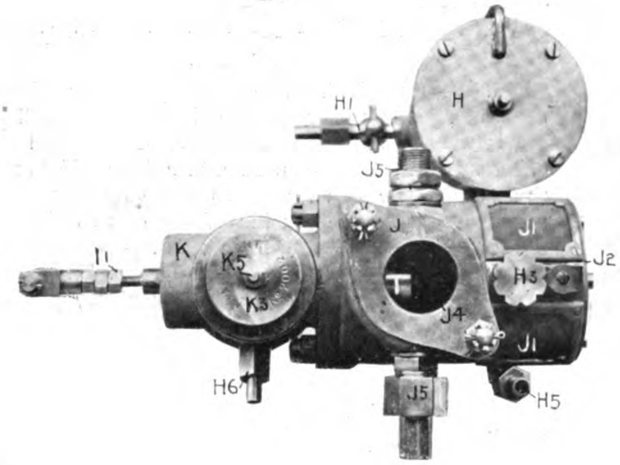


FIG. 3.—View of the Automatic Carburettor from above.

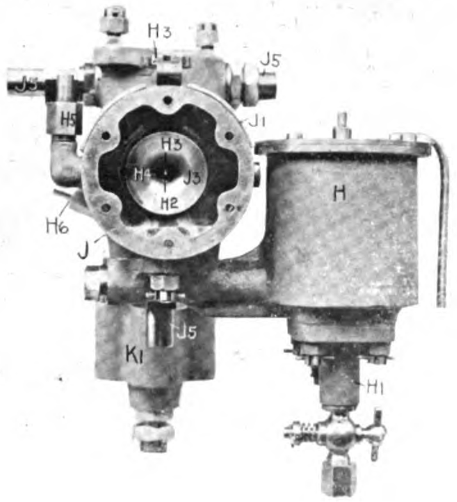


FIG. 4.—End view of the Automatic Carburettor in which the Cover Plate, J^2, has been removed to show the Induction Cone, J^3, the Spray Jet, H^2, the Needle Valve, H^3, and the Suction Jet, H^4.

valve normally in its closed position. The richness of the mixture, however, does not, strictly speaking, depend entirely upon this degree of vacuum, for there are other influences at work tending to increase the flow of petrol through the jet. The spring, too, when used, requires to be properly proportioned to its work, and correctly adjusted for it, besides which it is necessary that the valve (and the piston, if there is one) should move as freely and with as little friction as possible. In the carburettor with which we are now dealing, (1) the automatic valve is operated in accordance with the suction produced in a pipe which resembles the petrol-jet, and enters the mixing chamber close to it; (2) no spring is needed for normally closing the auxiliary air-ports; and (3) the column of mercury which acts as a relay for the automatic valve renders the friction of that valve unimportant, since the force exerted upon it by the mercury is considerable.

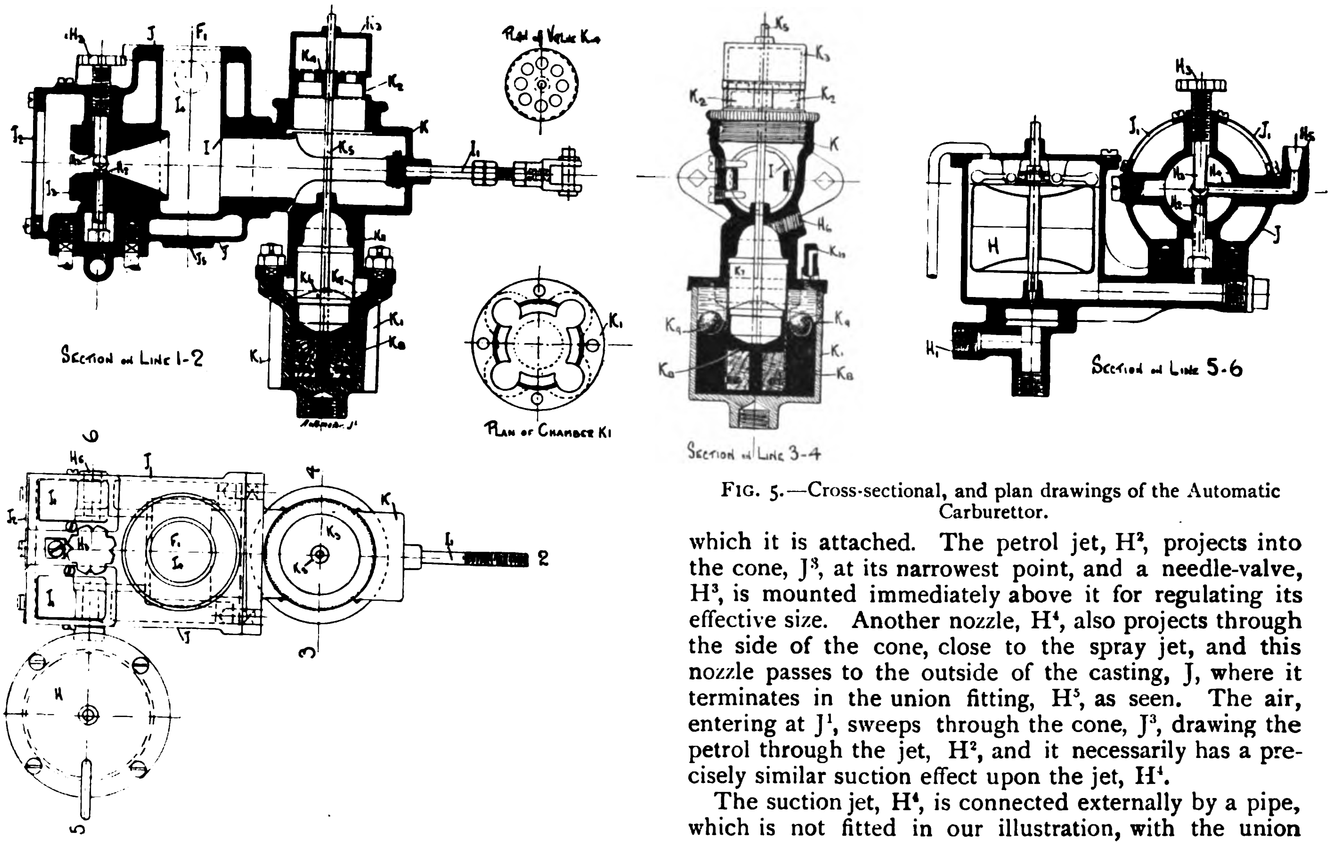


Fig. 5.—Cross-sectional, and plan drawings of the Automatic Carburettor.

The carburettor is shown from four different points of view in Figs. 1, 2, 3, and 4, and its entire construction is clearly indicated by line drawings in Fig. 5. In relationship to its position on the Crossley engine, Fig. 1 is a back view, Fig. 2 a diagonal view from behind, Fig. 3 a view from above, and Fig. 4 a view from the front end, in which the cover-plate (J^2) has been removed to show the induction passage in which the main air supply is carburetted during its passage through it. Fig. 5 shows three vertical transverse sections on the corresponding lines, indicated by letters on the plan in the same illustration. In Fig. 6 the automatic portion of the carburettor is shown taken apart, and the various portions constituting the chamber (K^1), which contains the mercury, are also seen separately.

The float-feed chamber, H, into which the petrol enters through the pipe-connection, H^1, is constructed in the usual way, and maintains a constant level of the petrol in the jet, H^2, which projects up into the mixing-chamber, J. The mixing chamber is divided into two compartments by an induction cone, J^3, the shape of which is seen in the section on the line 1—2 in Fig. 5. The air enters the casting, J, through the gauze-covered holes, J^1, behind the cone, J^3, this end of the casting being closed in by the removable plate, J^2. The casting, J, is water-jacketed, and the pipe connections, J^5, communicate with the jacket. The air, after passing through the cone, J^3, is drawn through the passage, J^4, to the induction pipe (F^1), its flow being controlled by the throttle-valve sleeve, I, which can be made to meet the cone when it is pushed forward to its full extent by the rod, I^1, to which it is attached. The petrol jet, H^2, projects into the cone, J^3, at its narrowest point, and a needle-valve, H^3, is mounted immediately above it for regulating its effective size. Another nozzle, H^4, also projects through the side of the cone, close to the spray jet, and this nozzle passes to the outside of the casting, J, where it terminates in the union fitting, H^5, as seen. The air, entering at J^1, sweeps through the cone, J^3, drawing the petrol through the jet, H^2, and it necessarily has a precisely similar suction effect upon the jet, H^4.

The suction jet, H^4, is connected externally by a pipe, which is not fitted in our illustration, with the union fitting, H^6, on the casting, K. This fitting, H^6, leads into the lower portion of the casting, K, which is partitioned off from the upper part, as seen in Fig. 5. The casting, K, is screwed down into the flanged cover-plate, K^{11}, of the mercury chamber, K^1, and this cover-plate fits closely down upon the top of a sleeve, K^7, which acts as a partition, inside the chamber, K^1. The sleeve, K^7, has a wooden plug inside it at the bottom, and its lower edge is slotted so as to render the interior of the sleeve in open communication with its exterior at the bottom of the chamber, K^1. The wooden plug has a hole drilled through its centre to let the mercury pass through and to act as a guide for a vertical spindle, K^5, which carries a wooden float, K^6, inside the sleeve, K^7, and at its upper end, carries a piston-valve, K^4, in the cap, K^3, above the chamber, K. The shape of the mercury chamber, K^1, is clearly seen in Fig. 6; the chamber is filled with mercury, K^8, up to about the level shown in Fig. 5. Under ordinary circumstances the level of the mercury inside and outside the sleeve, K^7, is, of course, the same, since it is continuous beneath the partition formed by the sleeve. Above the level of the mercury, however, there is no open communication through the partition, K^7, and the space immediately above the float is connected, as we have already said, with the jet, H^4, whilst the space outside the partition is in open communication, through a vent-fitting, K^{10}. with the atmosphere. Inside the sleeve the wooden float, K^6, rests upon the surface of the mercury, and outside the sleeve four steel balls, K^9, rest upon it to prevent splashing. The surface of the mercury is also covered with a thin film of glycerine to prevent it from creeping and from oxidising. By this arrangement, it will be seen that when the suction in the jet, H^4, reduces the pressure inside the sleeve, K^7, below that of the atmosphere, then the mercury inside it will rise to a higher level, carrying the float, K^6, with it, and the mercury outside the sleeve will sink to a lower level, carrying the balls, K^9, down with it. This occurs, of course, at the same time that the richness of the mixture formed in the induction cone, J^3, increases, and at a time when more auxiliary air is consequently required for diluting it. The float, K^6, being connected by the spindle, K^5, with the valve, K^4, gives the desired effect, because it then causes this valve to open the air ports, K^2, admitting air into the central portion of the chamber, K, whence it is free to pass through the throttle-valve sleeve, I, to mix with the over-rich charge in the induction pipe, F^1. The air-holes, K^2, are formed in the cap, K^3, in the top of which is another guide for the rod, K^5, over and above the intermediate guide in the chamber, K, and that in the wooden plug at the base of the sleeve, K^7. The level of the mercury inside the sleeve, K^7, depends at all times upon the degree of suction on the jet, H^4, so that the position of the auxiliary air valve, K^4, is automatically controlled to give the required opening to maintain a constant richness of the mixture. The adjustments provided for enabling the carburettor to be set to suit the engine to which it may be fitted, consist of the needle-valve, H^3, which regulates the effective size of the spray jet, H^2, and of means for changing the position of the valve, K^4, relatively to the spindle, K^5. The power and speed of the engine can, of course, be controlled by the throttle-valve, I, which intercepts both the carburetted air and also the auxiliary air supplies, and regulates the quantity from the maximum to zero. This throttle-valve, is intended either to be operated by hand or by an automatic governor, in conjunction with the usual accelerator lever or pedal. The characteristic feature of the patent controlling this carburettor is the employment of mercury to give the advantages which we have above enumerated, but we understand that it has also in certain cases been applied to render carburettors automatic in a somewhat different way, the changing level of the mercury being caused to vary the level of the petrol in the jet instead of to control the admission of auxiliary air; the same effect, however, is obtained, and the nozzle connection with the mercury chamber is fitted close up to the spray-jet, as shown in our illustrations.

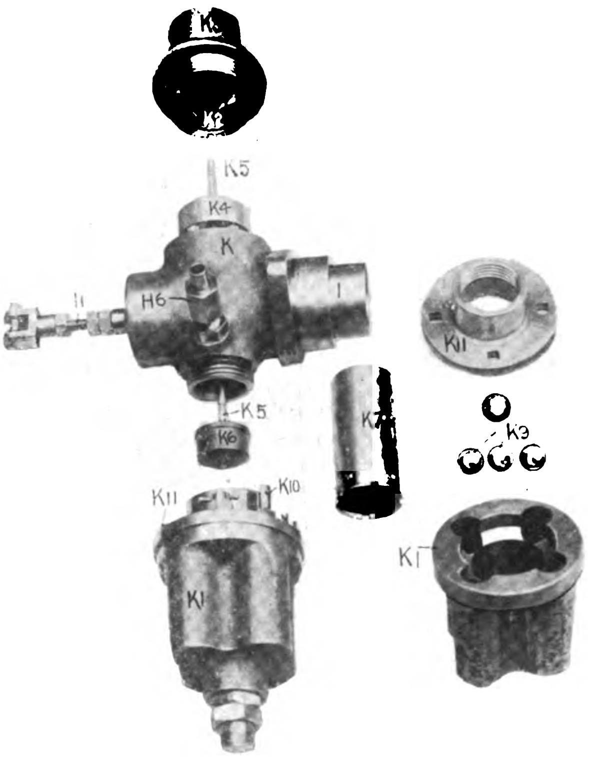


FIG. 6.—The Automatic Portions of the Carburettor showing the Auxiliary Air-valve, the Chamber containing the Throttle-valve, and the Mercury Float-chamber, separated from one another, and also showing the various portions of the Mercury Chamber, dismantled.

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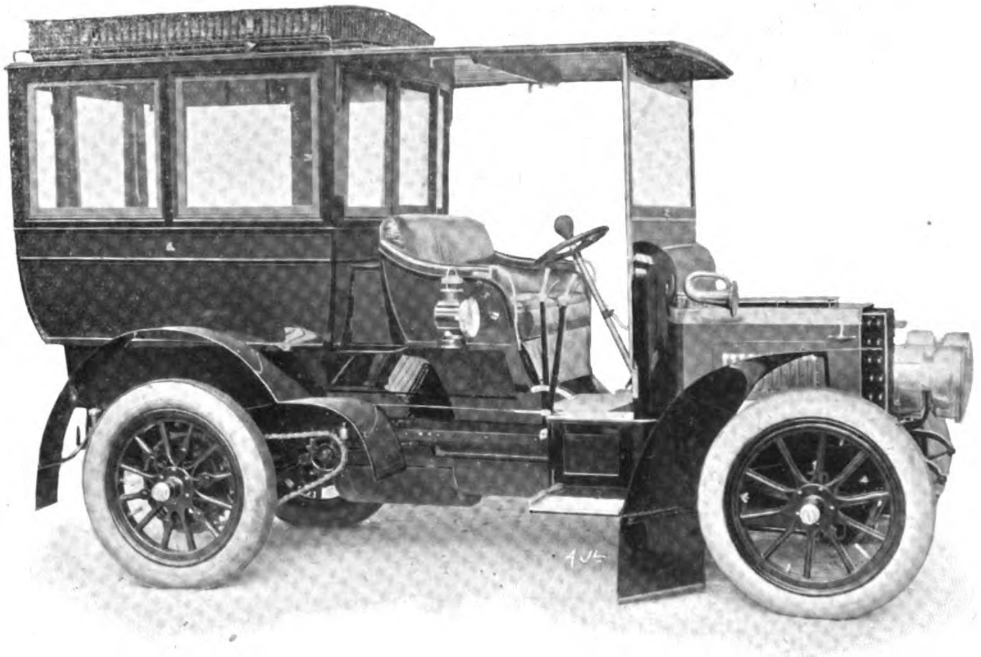
ALMOST every week sees a fresh proposal for dealing with the perennial problem of the congestion of London traffic. At the last meeting of the London Traffic Commission Mr. Meik, M.I.C.E., advocated the use of double-decked main streets to relieve the congestion. His suggestion is that the main streets within the four-mile radius should be provided with what would practically be a roof throughout their whole length, and a road surface be provided on this for the more rapid traffic. When asked how vehicles were to get up to and down from the roof, Mr. Meik stated that he would have inclines up to it from a number of secondary streets. Somewhat similar proposals have been made before, but naturally the main objection to them is to be found in the fact that the lower storeys of houses on the thoroughfares where the double-decked streets were constructed would be practically deprived of light, and that, we fear, would be an almost insurmountable objection to the introduction of the decked street. There seems, unfortunately, to be very little consensus of opinion as to what ought to be done in this important question. Perhaps when the Commission issues its report something like unanimity will be reached. It is to be hoped that this will be the case, for it will not be till long after that stage that our public bodies are likely to be induced to inaugurate any really satisfactory and drastic measures.

FOR the purpose of running a service of electric motor vehicles, taking their current from overhead conductors, between Kirchveischede and Gravenbrück in Germany, a company has been formed at Pilstein. In Switzerland it is sought to extablish a public service of electric motor vehicles upon the same principle between Locarno and Gravellona.

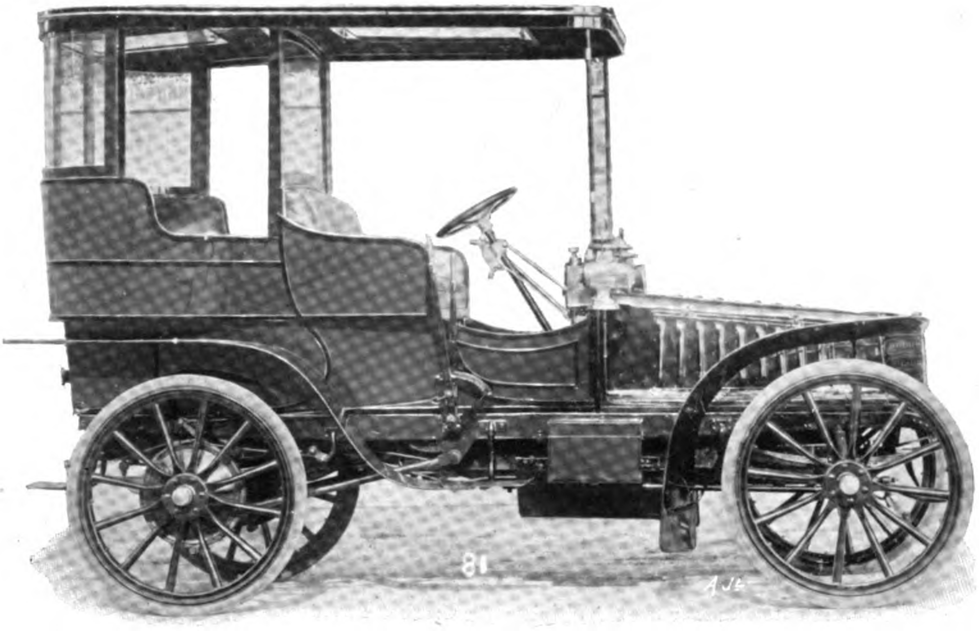
SOCIETY OF MOTOR MANUFACTURERS' EXHIBITION AT THE CRYSTAL PALACE.

Quite a large number of entirely new vehicles are to be on view at this very important show, which will be in full swing by the time these lines reach the majority of our readers, and will remain open until the 24th inst. A large proportion of these cars are of entirely British manufacture—a fact which will considerably increase the attractiveness of what bids fair to prove the most successful and comprehensive automobile exhibition that has ever been held. From reports received from the numerous exhibitors we notice, too, that almost every branch of the industry will be strongly represented, and it is evident that those interested in vehicles and 'buses of all types for commercial purposes, and those who are contemplating the purchase of motor launches (to say nothing of those requiring private cars of various kinds), will have an admirable opportunity or inspecting the most up-to-date models now available, and will find a very varied assortment from which to make a choice.

Amongst the new private vehicles, we propose dealing more especially in this brief forecast with the British cars, partly because they form such a prominent feature of the show, and partly because most of the Continental models have already been described by us in connection with the recent Paris Salon; there are, however, many new foreign machines, and these will be noticed in a subsequent issue. Cars, fitted with 6-cylinder engines, are being exhibited by the Napier Company, Wilson and Pilcher Limited (Sir W. G. Armstrong, Whitworth and Co.), the Ariel Motor Company, John Marston, Limited, and the Maudslay Motor Company. Full particulars, with illustrations, of the 18-h.p. Napier car are given in another column. The Wilson and Pilcher 18-24-h.p. engine has its cylinders placed horizontally, three on each side of the central crank-chamber, and the vehicle is of the same special design, in general respects, as this firm's smaller model, except that many important minor improvements have recently been made. They are exhibiting a complete car and a chassis, both of this 6-cylinder type and of the 4-cylinder 12-16-h.p. model, the smaller chassis being shown in motion to demonstrate the action of their special form of epicyclic change-speed-gear. The Ariel Motor Company's 6-cylinder engine is of 30-h.p., and is being shown fitted to a complete chassis. A 4-cylinder 15-h.p. chassis is also exhibited by them, as also samples of their 15-h.p. and 20-h.p. touring cars—some of which have "side entrance" bodies of novel construction. The 6-cylinder engine on the John Marston Company's car is of 16-h.p. and has its cylinders cast in pairs. The inlet-valves are arranged on the opposite side to the exhaust-valves, and the cylinders are identical with those used on the 4-cylinder 12-h.p. model. The inlet-valves are not only mechanically operated, but their lift can be varied by sliding the cam-shaft, which operates them, longitudinally; the cams have for this purpose a tapering profile as on the Chenard and Walcker engine. A metal to metal clutch has been adopted, and an automatic carburettor is employed. Only two forward speeds, and a "reverse," are provided by the change-speed-gear; the car has a side-chain form of transmission, and a direct-through drive to the countershaft is obtained on the top speed, the lay shaft being then stationary. A Maudslay Company's 6-cylinder model consists of the 40-h.p. chassis, and another new vehicle of theirs is a 3-cylinder 18-h.p. car constructed on the same general



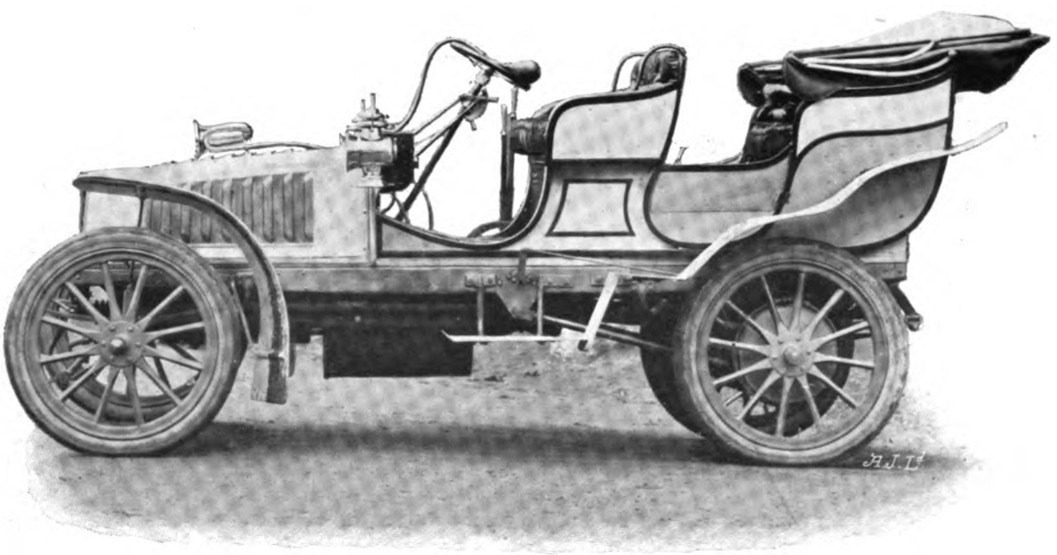
A 25-h.p. Maudslay Convertible Wagonette Omnibus.



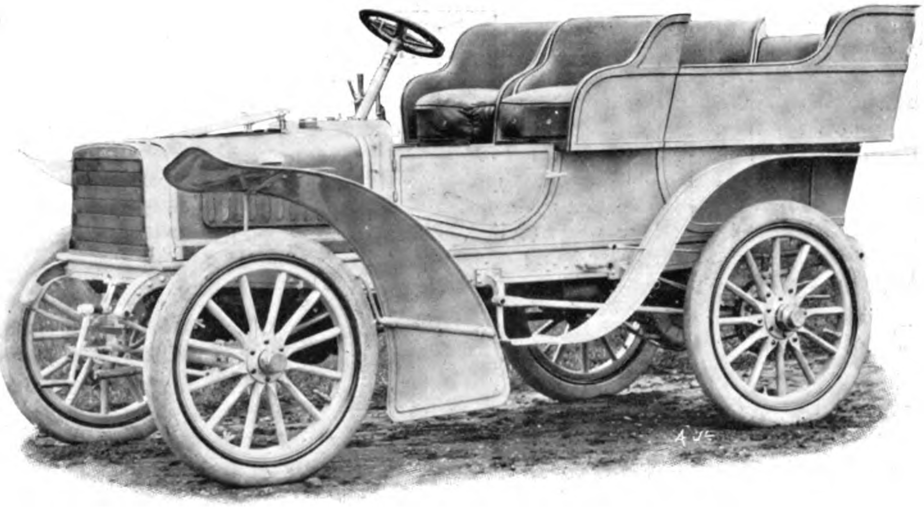
A 20-h.p. Thornycroft Tonneau, with Canopy Top and Glass Windows.

lines as their 25-h.p. vehicles; improvements have been made in the throttle device, and steadier running is ensured by rendering the carburettor automatic.

Amongst other new English petrol vehicles, the Crossley car, which has been very fully dealt with by us recently, should be examined on the stall of Messrs. Jarrott and Letts. The 20-h.p. Hutton chassis is of very novel design throughout, and comprises the various patents of Mr. T. W. Barber. Messrs. Hutton also represent the well-known Brooke cars, built at Lowestoft, and are showing the 1904 standard vehicle, which has a 3-cylinder 14-h.p. engine, and the maker's type of gear-box in which chains and jaw-clutches are substituted for sliding spur-wheels. The 12 and 18-h.p. Siddeley cars, which are built for the Siddeley Co. by the Wolseley Co., and are described in another column, are also worthy of close attention, whilst it is unnecessary to mention that a very complete show is being made by the Wolseley Company themselves with their own 1904 models. The special features of the Daimler exhibit are the cars fitted with the latest slow-running engines, having mechanically-operated inlet-valves, single-trembler coil-ignition system (and magneto when desired), automatic carburettor, and new form of radiator; the 28-36-h.p. engine has cylinders of 110 mm. bore, the stroke is 150 mm., and the speeds over which the range of power, mentioned, is obtained are from 750 to 1,000 revs. per min.; the cylinders of the 18-22-h.p. engine have a bore of 95 mm., and the stroke is 130 mm. A 7-h.p. twin cylinder vehicle is another attractive model

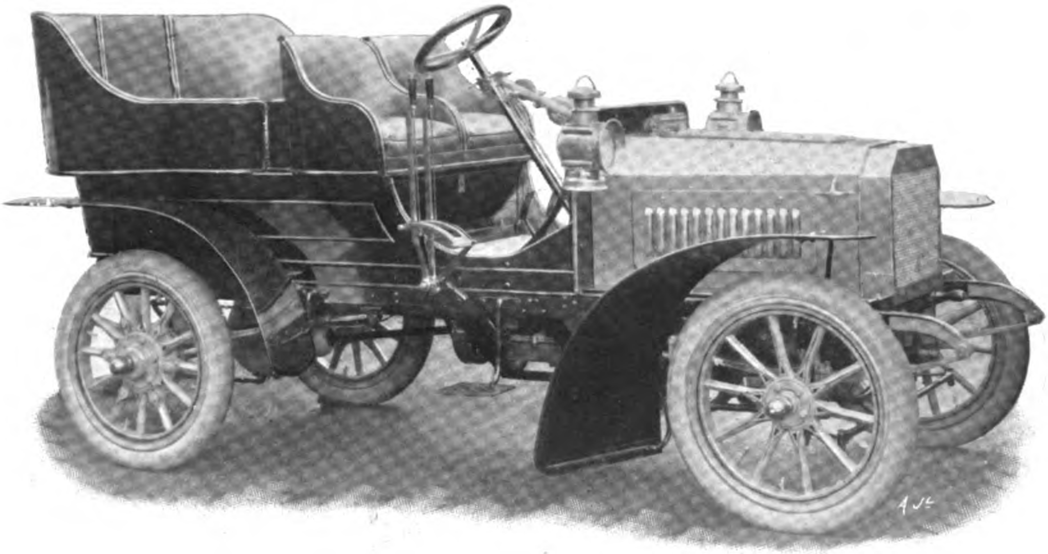


A 20-h.p. Thornycroft Double Phaeton, with Side Entrance and Hood to the Rear Seat.

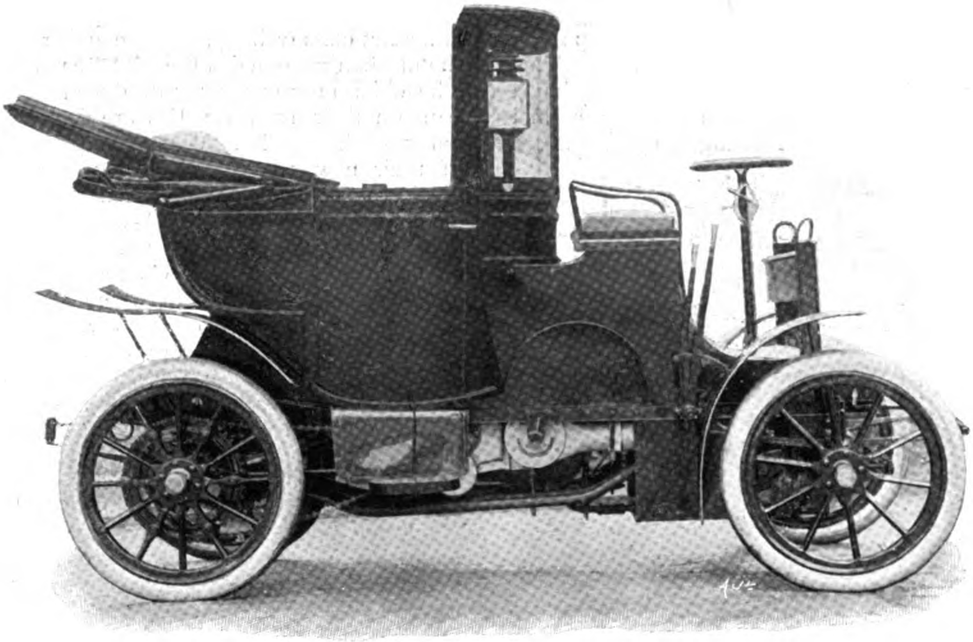


A 10-h.p. twin-cylinder Ryknield Tonneau.

made by them. The latest Thornycroft vehicles are shown. An interesting 12-h.p. car, having several points about it which are well worth attention, is the chief attraction shown by the New Orleans Company, whilst amongst British-built petrol vehicles, which are entirely new to our readers, mention should be made of those exhibited by the Ryknield Engine Company, the Albany Manufacturing Company, and Messrs. Lamb Brothers. The New Orleans vehicle has the engine and the gear-box constructed so as practically to form one piece, and the main clutch between them is of very novel construction. It is of the internal cone type, with leather friction surface on the inner member, and this cone is made in two pieces, so that either half can be removed separately and with very little difficulty. The three speeds and reverse are operated by one lever, the main frame is constructed of armoured wood, and the four cylinders have atmospheric inlet-valves; the bore and stroke are 85 and 110 mm. respectively, and the normal speed is 900 revs. per min. The Ryknield cars have 10-h.p. twin-cylinder engines, and are fitted with touring bodies, as delivery vans, and as station carts. The touring chassis has a pressed steel frame, adjustable steering gear, a duplex clutch, and is being shown in motion on the stand, driven by an electric motor, to demonstrate the action of the various parts. The Albany Manufacturing Company make a special feature of their 10-h.p. "Silent safety" car, and of a 16-h.p. 4-cylinder vehicle. The 15-h.p. Rose car, the chassis for which is exhibited by Messrs. Lamb Bros., has a pressed steel frame fitted with an underframe for supporting the engine and the gear-box. The engine has three cylinders, each of which is a separate casting; they have a bore of 102 mm., the stroke is 127 mm., and the normal speed is 850 revs. per min. The inlet-



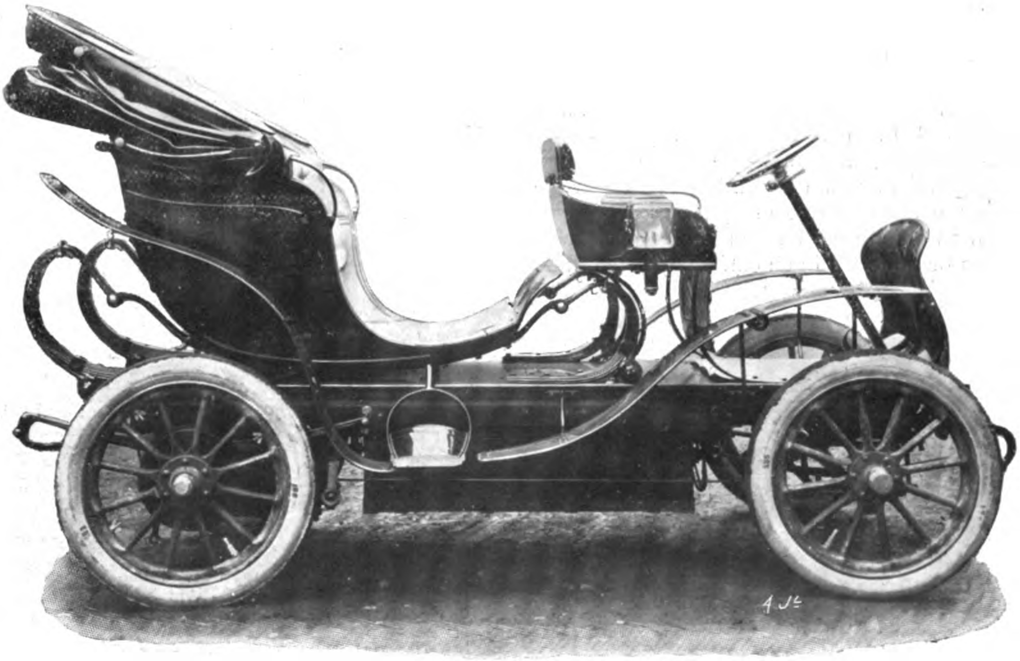
The 15-h.p. Rose Car, which has a 3-cylinder Engine.



One of the 4-cylinder 12 to 14-h.p. James and Browne Landaulettes.

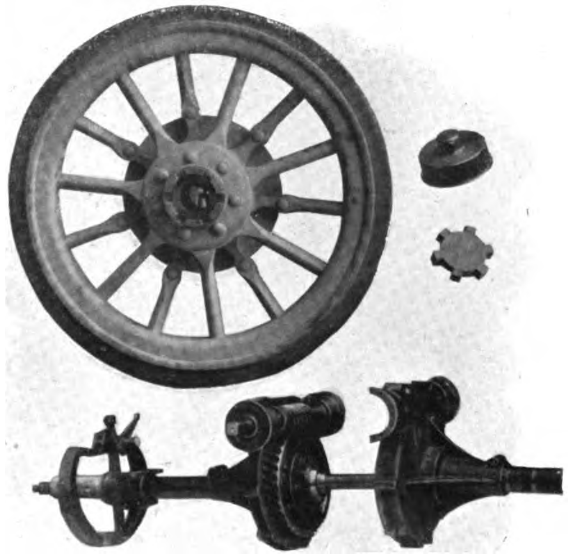
valves are mechanically operated, and have a variable lift; the lower portion of the crank-chamber is detachable without disturbing the four crank-shaft bearings. The gear gives three speeds and a reverse, with a direct drive on the top speed to the live-rear-axle. Messrs. Rose Bros., of Gainsborough, are the manufacturers.

The Langdon-Davies vehicles are, this year, fitted with an entirely new change-speed-gear, in which the gear-wheels are at all times in mesh with one another. The mechanism operating the gear is arranged in conjunction with the clutch pedal so that an automatic action is obtained between them. One of these gears is shown in operation on the maker's stall. The Swift Motor Company are introducing light cars of 7-h.p. and of 10-h.p., in which a Panhard type of change-speed-gear is employed. Both models have live rear-axles; the engine on the smaller is of the De Dion single-cylinder type, and that on the larger is a twin-cylinder Aster with mechanical inlet-valves. The Company are also showing their new motor bicycle, in which a worm



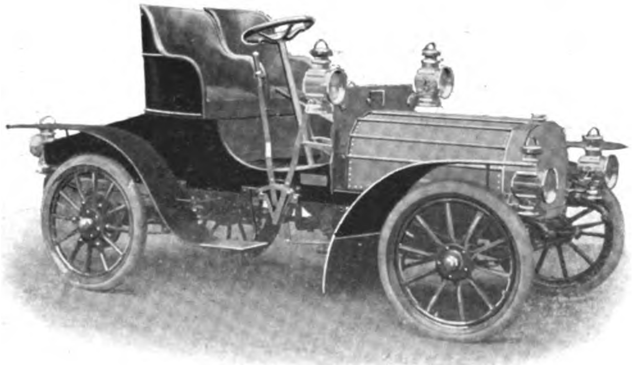
The Electromobile Company's *Car de Luxe*, on which the hooded seat is suspended on cee-springs.

drive is employed for the transmission. A somewhat novel feature for cars of the usual live axle type has been adopted by Dennis Brothers, Limited. This consists of a worm and worm wheel instead of bevel wheels for transmitting the power from the longitudinal shaft to the differential gear. The larger, 1904, cars are also fitted with the double-artillery wheel, seen in our illustration, and the wheels are mounted so that they take a bearing upon the ends of the tubes surrounding the live axle, and thus take the weight of the car off the revolving shafts. A new gear-box is also fitted and the carburettor is rendered automatic; the Dennis spring-cushion-drive is retained.



The Dennis Double Artillery Wheel, and the Worm-driven Live-rear-axle.

Messrs. Pritchetts and Gold are showing their new 30-h.p. "Meteor" chassis, in addition to 12-h.p. cars both of the live-axle and of the side-chain types. The larger vehicle has four speeds and a reverse, the motor has four cylinders, the main frame is made of pressed steel, and the wheel-base is 8 ft. 9 ins. Messrs. James and Browne are introducing a new 4-cylinder 12–14-h.p. vehicle, having cylinders with a 3½-in. bore, and a stroke of 4½ in. Either mechanical or atmospheric inlet-valves can be fitted, an automatic carburettor is employed, and all the valves can be removed in an extremely short time.



The Albany "Silent Safety" Petrol Car.

The chassis has been specially designed to suit a landaulet class of body, but the general arrangement of the mechanism remains the same as on the 18-h.p. car. The chief improvements introduced by the Brush Company on their 1904 vehicles are dealt with in another column. The Belsize Motor Company are showing two of their new 15–20-h.p. cars, which are fitted with 3-cylinder engines, having mechanically-operated inlet-valves and nickel steel crank-shafts. They also have a light two-seated model of 7-h.p.

The Lanchester Engine Company exhibit one of their new 18-h.p. touring cars, in which the engine is water-cooled instead of air-cooled, as on their 10 and 16-h.p. models. They also show a 12-h.p. vehicle having a water-cooled engine, but otherwise, except in minor details, no departures have been made in the unique design of their machines. Other all-English vehicles of more or less novel design are shown by Messrs. Alldays, the Century Motor Company, Humber (Limited), and Messrs. Thompson and Co. (the "Achilles"). Pressure on our space this week, however, prevents us from giving them more than passing mention here, and we are compelled to hold over all reference to the many excellent Continental and American cars which are on view.

An interesting electric vehicle, in which the comfortable body is suspended on Cee springs—as seen in our illustration—is exhibited by the Electromobile Company.

Most of the well known makers of steam lurries are well represented, and many of them show improvements of a more or less detail character. Messrs. Thornycroft, Straker, and Coulthard may be mentioned amongst earlier established firms building them, and the Rectory Engineering Company and the Bristol Wagon and Carriage Company amongst those who have more recently taken up this work. Comparatively few really heavy vehicles fitted with petrol engines are exhibited, those of the Milnes-Daimler Company again being about the only examples.

Motor launches, or petrol engines specially designed for this work—several of them fitted with the necessary reversing gear and propellers—are shown by the Napier Company (S. F. Edge, Limited), Messrs. Thornycroft, Messrs. Hutton, the Ariel Motor Company, the Maudslay Motor Company, Messrs. Brooke and Co., the Grosvenor Engineering Company, the Simms Manufacturing Company, the Milnes-Daimler Company, and the De Dion Company.

The Langdon-Davies Petrol Van.

THE NAPIER 6-CYLINDER 18-H.P. CAR.

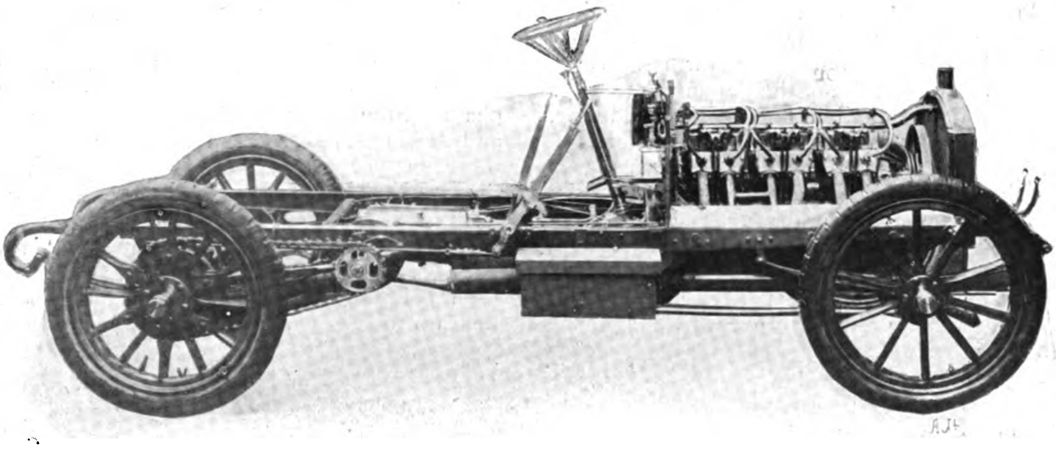


FIG. 1.—View of the 6-Cylinder 18-h.p. Napier Chassis from the right side.

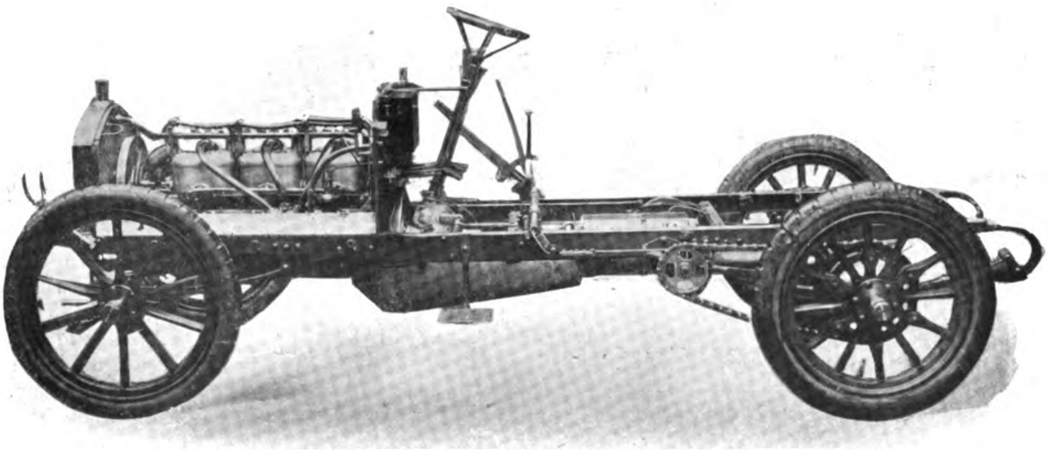


FIG. 2.—The 6-Cylinder Napier Chassis from the left.

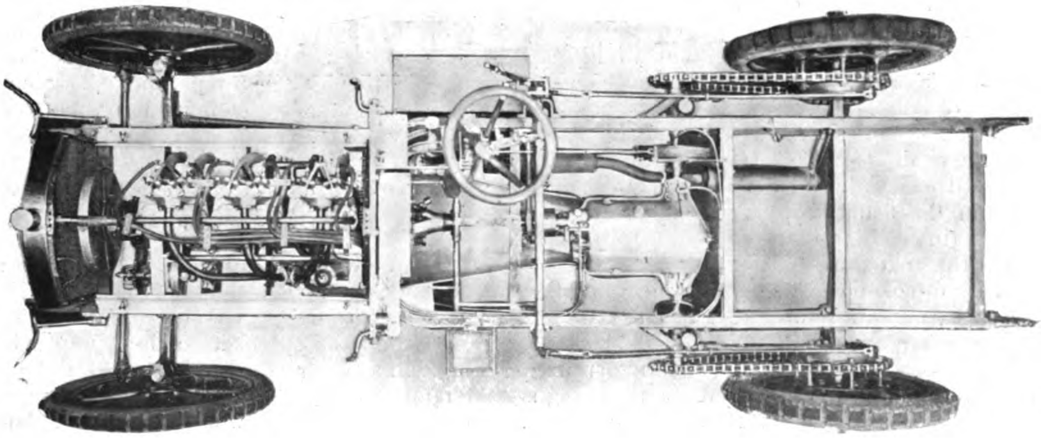


FIG. 3.—View of the New 18-h.p. Napier Chassis from above.

This vehicle, which will undoubtedly form one of the chief attractions at the Exhibition, has many extremely interesting features, the chief amongst which is the employment of a 6-cylinder engine of sufficient power to enable the car to be driven on the top speed under all ordinary conditions; further characteristics facilitating this object of the designers are to be found in the main clutch and in the change-speed gear, the former of which is designed so as to allow for slipping when desired, and the latter is constructed so that a direct-through-drive is obtained to the differential countershaft, and none of the other wheels in the gear-box revolve (even idly) when the top speed is in use.

The weight, too, of the vehicle has been kept low, for the chassis only weighs about 17 cwt., although the engine, which is nominally of 18-h.p., develops about 30-b.h.p.

Three views of the complete chassis, without its bonnet, are given in Figs. 1, 2, and 3, these being taken from each side and from above respectively. The main-frame is constructed of pressed steel, and its side members have a tapering section, besides being brought nearer together in front of the dash than behind it. The engine is fixed rigidly by six feet projecting from the upper portion of the crank-chamber, to the sides of the main-frame, and it and the clutch are completely enclosed by an aluminium casing on the underside, which extends back to meet the gear-box, and narrows off between the clutch and this box. The gear-box is held in place by a 3-point suspension, its weight at the rear being taken by the countershaft. It therefore floats, and is self-aligning.

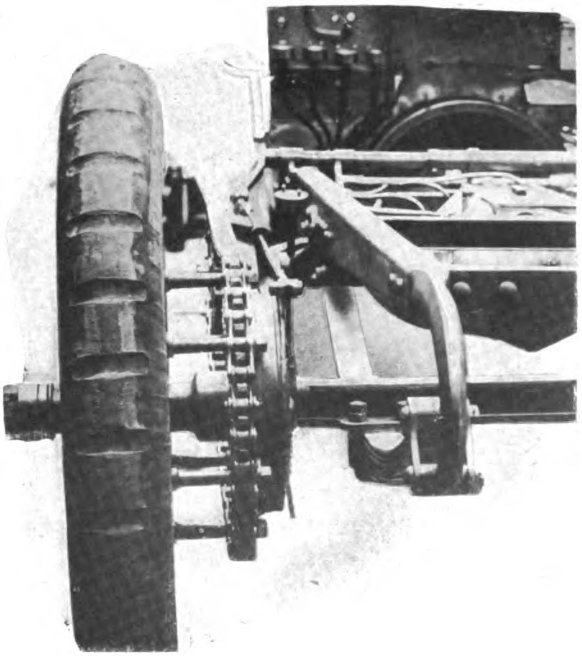


Fig. 4.—View showing the arrangement of the Rear Springs beneath the Straight Back Axle on the latest Napier Car.

The main-frame is carried on very long semi-elliptic springs lying beneath the side-members of the frame, and those at the rear are fixed, as seen in Fig. 4, beneath the back axle, so that the axle itself may be perfectly straight, although the frame lies on a low level. Both axles have an H cross-section and are made of nickel steel, the front axle is bent downwards centrally and the spring is attached to it from above in the usual way. The projecting horns for the front springs are formed by the frame itself, whilst those at the rear are separate forgings. Special side brackets are fitted on each side, in front, to receive the lamp brackets, which are turned with a taper at their lower ends, and slope diagonally upwards. The wheel-base is 9 ft., so that in conjunction with the long springs, and the smooth-running engine, very easy travelling is ensured. The wheels are intended to take 36-in. tyres, those at the back being 4¾ ins. wide, and those in front 4 ins. Although the frame is built low, there is a minimum clearance of 10 ins. between the mechanism and the road.

The engine is seen in place on the car, both from the right-hand side and from the left, in Figs. 5 and 6 respectively.

The cylinders are cast in pairs, and have their inlet-valves arranged immediately above the exhaust-valves on the right side. All the valves are operated from a single cam-shaft, which is enclosed in the crank-chamber, the inlet-valves being actuated by vertical rods and rocking levers as seen in Fig. 5. The inlet-valves for each pair of cylinders are held down in place by three nuts, and a separate induction pipe passes across from the carburettor, on the left, for each pair. These valves are of the Napier multi-seated type, giving a very large opening. Separate exhaust pipes are led from each cylinder to a large expansion box beside and beneath the engine, from which the gases are conducted consecutively through two other silencers placed longitudinally, as seen in Fig. 3. High-tension ignition plugs are fitted horizontally into the valve-chambers between the valves, and the wires are led to them from a box containing the ignition apparatus, including the commutator, placed centrally behind the dash. The commutator is driven by a chain from the engine, and the time of ignition can be varied by a hand-lever fixed to the steering pillar beneath the wheel, the horizontal shaft from which passes across to the top of the dash.

A single coil is employed for all six cylinders, and absolute synchronism is ensured by the distributor. The revolving parts inside the case are fed with oil from a lubricator on the dash, fixed to the left of the case, as seen in Fig. 7.

The carburettor is of the Napier type, and is fitted with the hydraulic air-regulator described by us on Oct. 24th last. It is visible in Fig. 6, where it will be noticed that a rubber pipe, through which auxiliary air can be admitted through a shutter, passes from it to the dash.

The throttle valve is controlled by a centrifugal governor, a part of which is seen in Fig. 6, the connection between these two mechanisms being very direct.

The governor is mounted upon the rear end of the pump spindle, and this spindle runs in ball bearings. The pump is driven by a chain from the cam-shaft, and the drive from the sprocket to the pump spindle is taken through a two-pronged fork, so that in the event of any foreign matter finding its way into the pump to stop it, no serious damage would be done, but the easily-replaced prongs only would be broken. The water is circulated through each of the three jackets entering at the bottom, and returning to the radiator from the highest point. The radiator is fitted sufficiently high

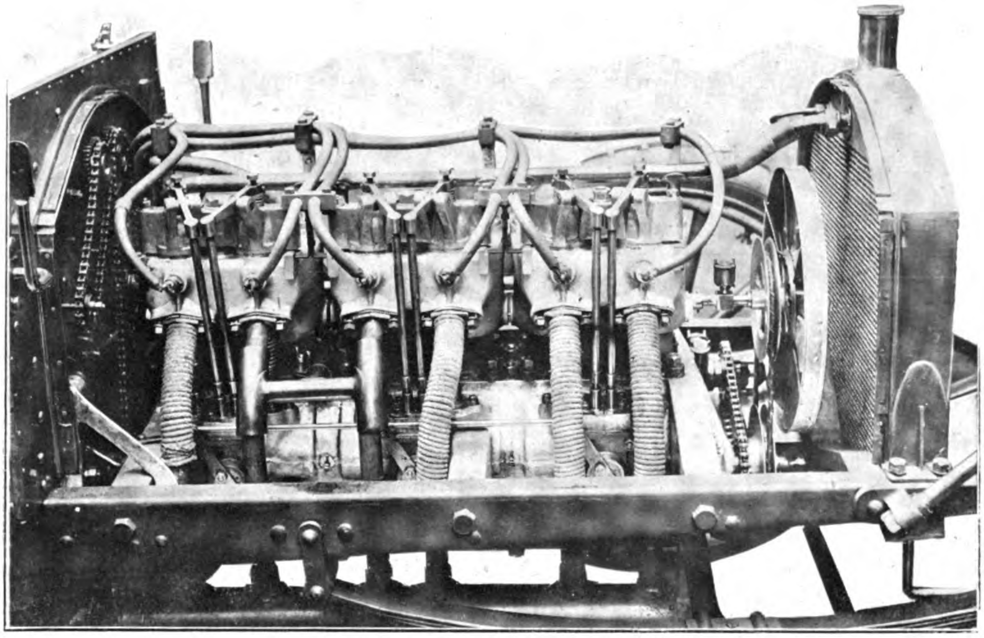


FIG. 5.—The 6-Cylinder Napier Engine from the right side, showing the position of the mechanically-operated Inlet-Valves, above the Exhaust-Valves, and of the Ignition Plugs between the Valves.

up to ensure natural circulation in the event of the pump failing to work, and it is of very compact design, being narrower than usual. The tubes of which it is built up are corrugated with four deep flutes, and as they are also very thin, they offer very effective cooling surfaces. An aluminium fan is fitted behind the radiator, and this is driven by a belt from a pulley on the front end of the cam-shaft. A "manometer" on the dashboard is connected with the water system.

The engine is fed with oil from a mechanical lubricator on the right side of the dash, and a small hand-pump is also provided in the same fitting. The lubricator is driven through a pair of spur-wheels and a chain from the commutator spindle.

The starting-handle is arranged so that it fits direct on the end of the crank-shaft, instead of being connected with it through any form of gearing. The cylinders have a bore of 4 in., and the stroke is 4 in. The speed of the engine can be varied over a very wide range, and it develops about 30-b.h.p. at a speed of 900 revs. per min.

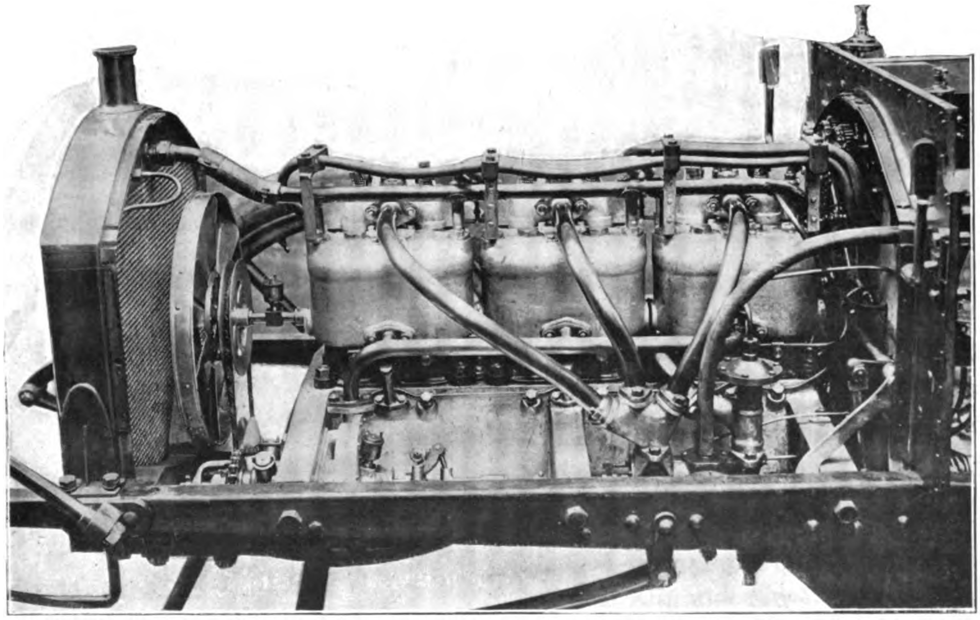


FIG. 6.—The 6-Cylinder Napier Engine from the left side, showing parts of the Circulating Pump, the Governor and the Carburettor.

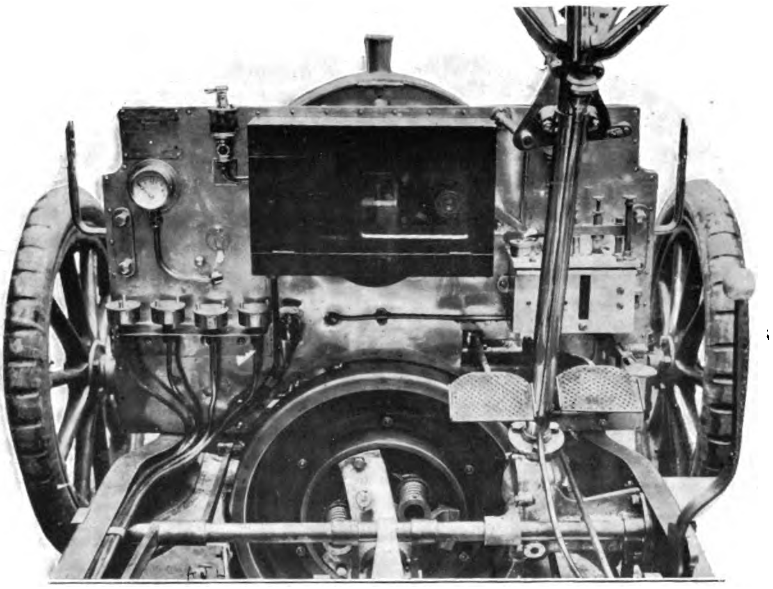


FIG. 7.—The central portion of the 6-Cylinder Napier Chassis, showing the Dash, the Main Clutch, and a portion of the Steering Gear.

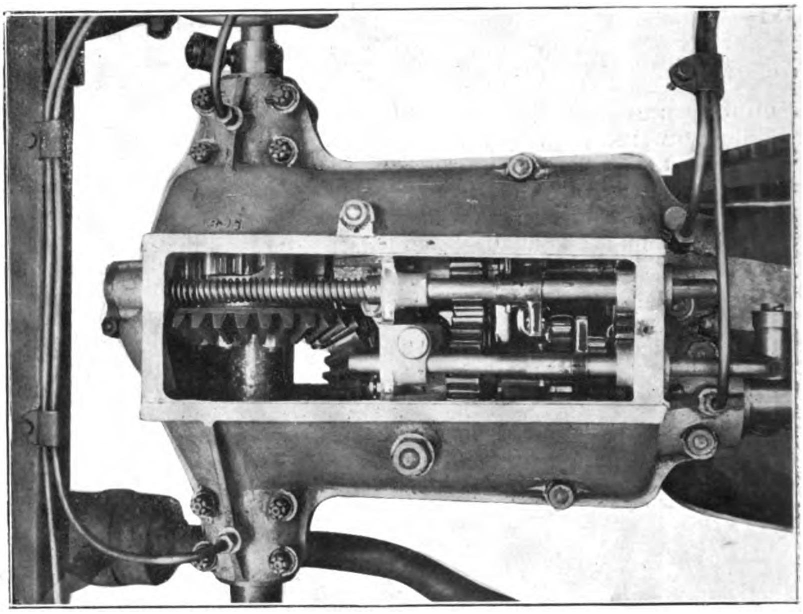


FIG. 8.—View of the Napier Gear-Box, with its Cover removed, from above.

Its speed is for the most part controlled by the small hand-lever mounted inside the curiously shaped steering wheel, which will be noticed in our illustrations, this lever varying the volume of the charge drawn into the cylinders. An accelerator pedal acting against the governor is also provided.

The steering gear is, in general respects, similar to the Napier design which has previously been described by us, and is adjustable throughout. The actual gear itself is, as seen in Fig, 7, fixed to the main frame, and is further stiffened by the transverse shaft by which the clutch is operated.

The main-clutch has metal-to-metal friction surfaces, is of the internal type, and imposes no end thrusts upon the shafts. We are told that it is capable of transmitting as much as 40-h.p., and that it can be set so that a weight of 2 lbs. on the foot-pedal is sufficient to cause it to slip. It is normally held in engagement by three easily-adjustable springs; the pedal operating it, as also the brake pedal, which lies to the right of it, is mounted in bearings on the dash, and has a very large foot-plate. The system of levers connecting this pedal with the clutch is arranged in a somewhat unusual manner, and the clutch is inter-connected with both brakes.

A special universal joint formed by a square block with rounded ends fitting in the corresponding square socket is introduced between the clutch and the change-speed gear. It is made of hardened steel, its machined faces are ground true, and the socket is made in two parts in such a way that either the engine or the gear-box can be removed without disturbing the other of them. A general view of the gear-box from above with its large cover removed is given in Fig. 8, where it will be noticed that the direct-through-shaft, and the lay shaft, are very short, although the gear wheels are of large size. The sliding rods which operate the gear are arranged on top, and the large inspection cover is made taper-shape so that it only needs a single screw to hold it in place. When the top speed is in use, the lay shaft and the intermediate reverse wheels are at rest, so that no unnecessary friction is introduced into the mechanism. The gear-box is lubricated from greasers on the dash; they are seen in Fig. 7.

The foot-brake on the countershaft is water-cooled, and has metal-to-metal surfaces. The side-brakes are compensated by a steel cable, and are of the internal enclosed type, in deference to the wishes of customers, although the makers consider that the ordinary band-brakes hitherto employed by them are equally satisfactory.

Two side-levers are fitted for operating the change-speed gear, the smaller of these introducing the "reverse." The adoption of a second lever has been determined upon because it permits the gear-box to be considerably reduced in size and weight. On the first few cars provision is made (as seen in Fig. 5) for varying the lift of the inlet-valves, but we understand that this will not be fitted in future, because the advantages of a variable lift mechanism are sufficiently obtained by the carburettor alone.

One complete car, fitted with a side-entrance body and canopy, as also a chassis, will be on view at the Show, in addition to three 15-h.p. vehicles, and a large 24-h.p. Pullman accommodating six people.

* * *

THE Automobile Club General Meeting is postponed one day, to March 10th.

THE SIDDELEY PETROL CARS.

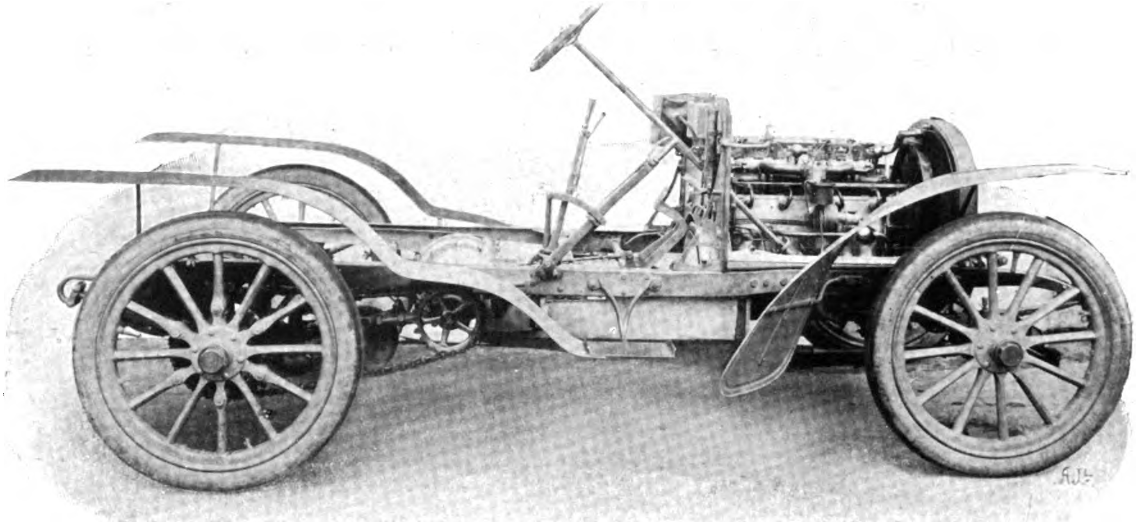


FIG. 1.—Side view of the New 18-h.p. Siddeley Chassis.

THE latest vehicles put on the market by the Siddeley Autocar Company have been built for them, to their specification, by the Wolseley Tool and Motor Car Company, and have many special features of interest. These cars are entirely unlike the vehicles which the Wolseley Company manufacture for themselves, and more nearly resemble the majority of cars now on the market, having vertical engines mounted in front, from which the power is transmitted through the main clutch and a universal joint to the change-speed-gear before it is applied to the rear wheels by the side chains passing from the differential countershaft. Two models of this new type of vehicle are being made, the larger being of 18-h.p., having a 4-cylinder engine, and the smaller being fitted with a twin-cylinder 12-h.p. engine. One of the larger chassis is seen from the right-hand side in Fig. 1, where it will be noticed that it is constructed with a pressed steel main frame to which the engine and the gear-box are fixed direct, and that these mechanisms are closed in on the underside. The engine itself is

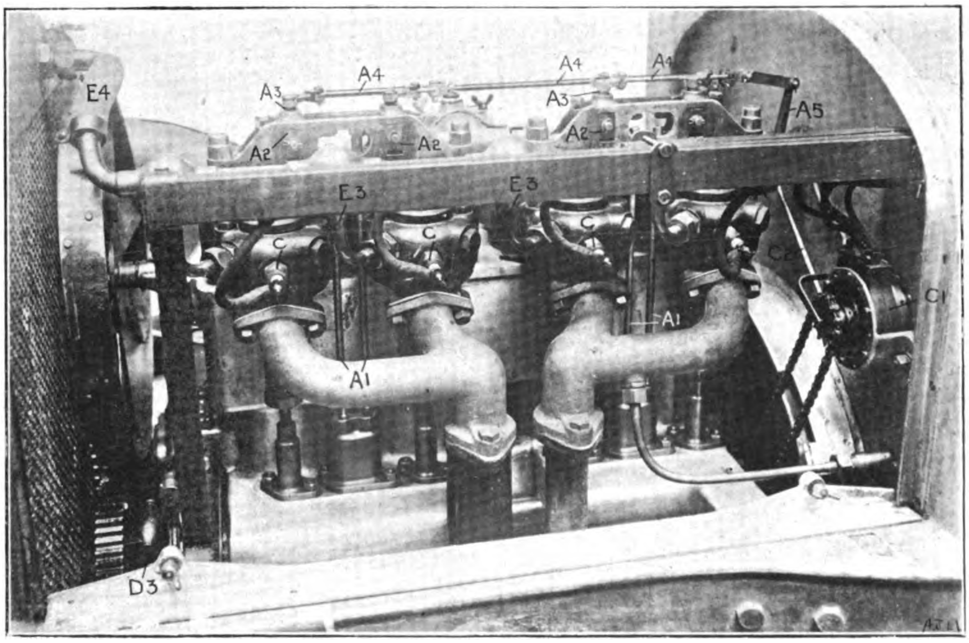


FIG. 2.—The 4-Cylinder 18-h.p. Siddeley Engine from the left side, showing the mechanism for varying the Lift of the Inlet-Valves, which are arranged above the Exhaust-Valves.

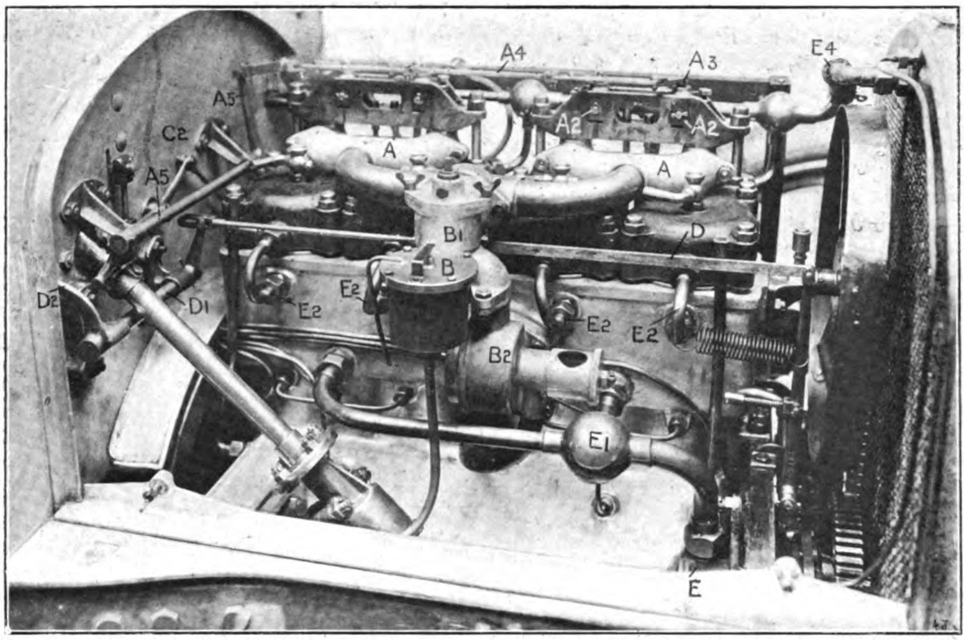


FIG. 3.—The 18-h.p. Siddeley Engine from the right side, showing the Automatic Carburettor.

seen in place in the car, from the left side, in Fig. 2, and from the right side in Fig. 3. The cylinders are formed by liners, which fit down into aluminium water-jackets forming a part of the crank-chamber, and the cylinder heads are separate castings, having their own jackets, and being bolted down in place. The inlet-valves are aranged above the exhaust-valves, and each pair of them is held down by a specially-shaped yoke and two nuts. The inlet-valves are operated by vertical spindles, A^1, from the same cam-shaft as the exhaust-valves, the rods, A^1, engaging with rocking levers, which are pivoted in the yokes above the valves. The actual fulcrums are formed by pins in sliding blocks, A^2, which can be moved a certain distance upwards or downwards by small vertical feed-screws, A^3, the effect of which is to introduce more or less backlash between the cams and the valves, thus giving a variable lift. The feed-screws, A^3, have projecting arms at their upper ends, so

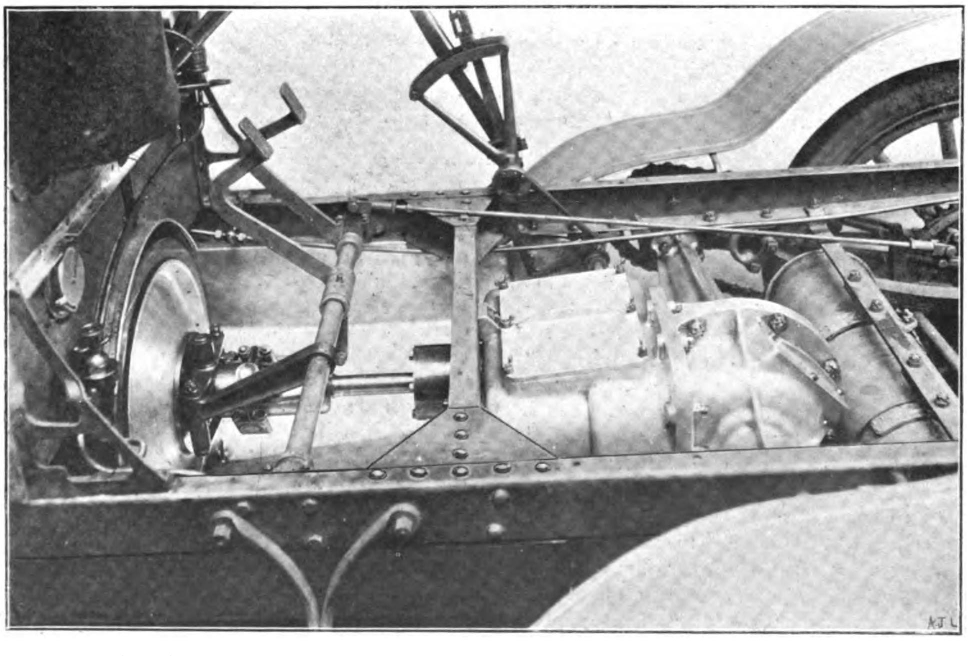


FIG. 4.—The central portion of the Siddeley 18-h.p. Chassis, showing the Clutch, the Gear-Box and the Universally-jointed Shaft connecting them together.

that they can be connected together by the rods, A^4, and operated simultaneously through the system of levers, A^5, from a small hand-lever above the steering wheel.

The branched induction pipe, A, leads from the carburettor to the four inlet-valves; the carburettor has a float-feed chamber, B, a mixing-chamber, B^1, and the air enters through the adjustable cap in the lower chamber, B^2. A constant degree of richness is ensured by an automatic spring-controlled valve regulating the admission of auxiliary air. A throttle valve is fitted which is connected by the rod, D, with the governor, D^3 (Fig. 2), and with the shaft, D^1, to which the accelerator pedal, D^2, is fixed. The throttle-valve is normally controlled by the governor to maintain the desired normal speed of the engine, but this speed can be exceeded when the accelerator pedal is depressed, and the valve held open by it.

High tension ignition plugs, C, are fitted between the valves in the valve chambers, and the commutator, C^1, which is used in connection with them, is mounted in front of the dashboard as seen in Fig. 2. The time of ignition can be varied by a lever on the dash through the rod, C^2, and the commutator is driven by a chain from the engine. The circulating pump, E, is fixed to the right of the engine in front, where it is driven by gearing, and takes its supply direct from the bottom of the honeycomb radiator. The water is forced by it through the pipe-fitting, E^1, into the bottom of the aluminium water jackets, and it afterwards finds its way out into the jackets around the cylinder heads through the four bent pipes, E^2, as seen in Fig. 3. The water is led back from the jackets in the neighbourhood of the valve chambers by the pipes, E^3 (Fig 2), which are connected together, and with the top of the radiator, by the pipe, E^4. The engine is lubricated through a sight feed fitting on the dash, the oil passing to all the bearings.

The main clutch is of the cone type and is of large diameter; it has a plain leather face, and is so arranged as to be always perfectly in line with the flywheel. The thrust is taken by a ball bearing, and the spring is enclosed in the clutch. The clutch, together with the pedal operating it and the brake-pedal, are visible in Fig. 4, where it will also be noticed that a universally jointed shaft is introduced between the clutch and the gear-box. The gearing provides for four forward speeds and a reverse, and the side lever operating it is ingeniously arranged so that it is locked positively in any of its working positions. The shafts in the gear-box are very short, and are mounted in ball bearings; the balls on the differential shaft are $\frac{9}{16}$ in. in diameter. Very powerful brakes are fitted. Simplicity has been aimed at throughout, all the parts are very substantial and the workmanship throughout is extremely good.

The twin-cylinder model is in general respects similar to that which we have just described. A chassis and a complete car of each type are to be on view at the Exhibition, and a couple of the small 6-h.p. voiturettes, with horizontal engines, will also be shown.

SOME OF THE FEATURES ON THE 1904 BRUSH CARS.

In addition to their 10 and 14-h.p. vehicles, the Brush Company are introducing a new 5-h.p. light car, and an 18-h.p. vehicle having several interesting improvements fitted to it. Samples of all of these are to be on view at the Crystal Palace Exhibition this week. The 18-h.p. engine is seen in Fig. 1, the auxiliary air valve, which is employed in conjunction with it, in Fig 2, and the main clutch, together with the flexible coupling between it and the first-motion-shaft of change-speed-gear, in Fig. 3. The engine has mechanically-operated inlet-valves arranged on the opposite side to the exhaust valves, and the cylinders are cast in pairs. The carburettor is mounted on the right side of the aluminium crank-chamber, and the induction pipe from it passes up to a branched pipe, H^1, with a second throttle valve, H, arranged at the junction. The carburettor is of the spray type with float-feed chamber, G, mixing chamber, and automatically governed throttle valve, G^1, the governor being fitted inside the gear wheel on the inlet cam-shaft. The auxiliary valve, J, is fixed above the throttle valve, H, this throttle valve being operated by hand, and automatically slowing down the engine when either of the foot-pedals are depressed or when the hand-brake is applied. The main body of the auxiliary valve, which is known as the "Doyle" valve, is a cylindrical chamber, upon the top of which is screwed a cap, J^1, having a large gauze-covered hole in its upper surface; the lower portion, J, screws over a threaded nipple, J^2, which is also screwed into the top of the throttle-valve, H. It can be screwed down to a greater or less extent over the nipple, and a lock-nut, J^3, is provided for holding it in any position. The valve contains a flat plate, J^4, cut away at intervals around the periphery to allow the air to enter when the valve is open, and the valve is normally held up against the cap, J^1, by a spring, J^5, so that it prevents any air from entering. It will

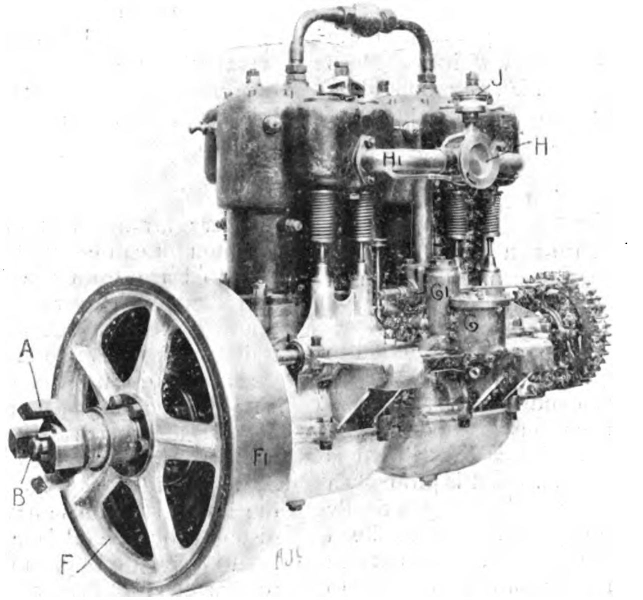


Fig. 1.—View of the 18-h.p. Brush Engine from the right side, showing the Doyle Valve, and the New Clutch.

be noticed that the extent to which it can open depends upon the adjustment of the valve, J, upon the nipple, J^2, and thus the quantity of air which can enter when the valve is opened can be regulated. When the hand throttle, H, and automatic throttle, G^1, are both open, this valve admits auxiliary diluting air, and tends to maintain a constant richness of the mixture. Even, however, when these valves are closed, air can still pass through the smaller pipes seen in Fig. 2 from the valve, J, to the engine, thus tending to cool the cylinders, when the engine is running light. The valve, therefore, serves the double purpose of rendering the carburettor automatic, and of scavenging the cylinders with cold air, when the car is coasting.

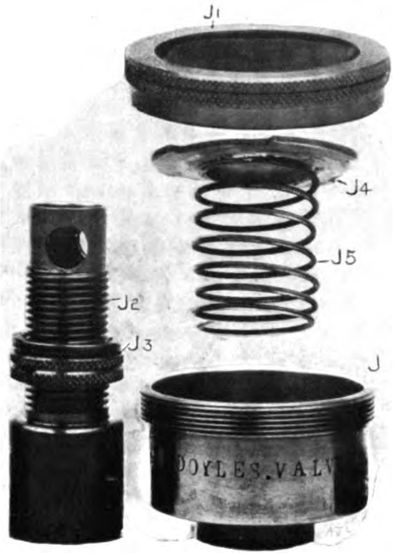


FIG. 2.—The component parts of the Doyle Automatic Auxiliary Air-Valve.

The main clutch is seen in position on the engine in Fig. 2, and is shown taken apart in Fig. 4. It is of the ordinary cone type, but the cone, F, which engages with the inner face of the fly-wheel, F^1, is mounted in such a way that no end-thrust is imposed on either of the shafts, and that the moving parts are self-aligning. The cone, F, is fixed to a central cast-steel boss, A, which is bushed internally to fit the shaft, B, projecting from the end of the crank shaft. The boss also receives a spiral spring, E^1, between it and the shaft, the larger hole for which extends through about two thirds of the length of the boss. Jaw-clutch members, A, are formed on the end of the boss, and these engage with the forked end, C^1, of the first-motion-shaft, C, forming a flexible coupling with the change-speed gear. A ball-thrust bearing, D, is placed beneath the spring, E^1, inside the clutch boss, and the spring is held in compression, engaging the clutch, by the pinned castle nut, E, which screws upon the end of the shaft, B. The clutch is actuated in the usual way by a pedal, and requires but little effort to disengage it. We understand that it has proved very satisfactory in practice, and that it takes up its load without any undue shock or slip.

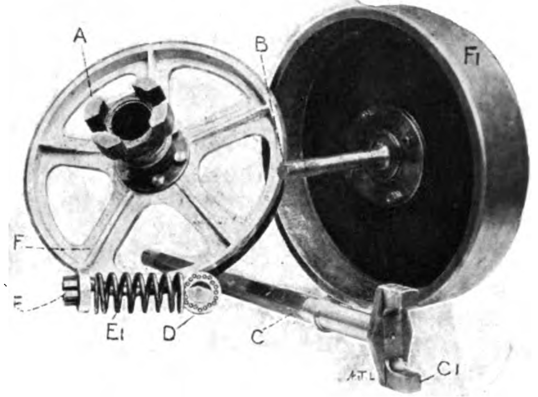


FIG. 3.—The various parts of the Brush Clutch, together with the First-motion-shaft of the Change-speed Gear.

A high-tension ignition system is fitted to the engine, and the commutator is now mounted on the end of the cam shaft, instead of on the dash; the time of ignition is varied by a lever on the steering pillar. All the bearings in the gear box and on the engine are lubricated and the bearings are bushed with white metal.

No. 91

is the stand number of the AUTOMOTOR JOURNAL at the Crystal Palace Show. It is near the centre of the main building, close to the High Level Railway entrance.

As we go to press it is a source of great satisfaction to record that the Exhibition, opening on Friday of this week, is in a splendidly forward condition for the reception of visitors on that day. The enormous work involved in preparing an important show of this description is hardly realised by the general public, and it is probably a revelation to them to know that for weeks past practically the whole of the interior of the Crystal Palace has been given over to the hands of the workmen. We noticed particularly last week, that in their efforts to be up to time, several of the exhibitors already had their stands fully completed, merely waiting for the placing of their exhibits. Prominent amongst the earliest in this respect were Messrs. Charles Jarrott and Letts, Ltd., and the Oldsmobile stand, Messrs. S. F. Edge, Ltd., running them close.

Every arrangement for the comfort of visitors that forethought can ensure has been made, and it is satisfactory to learn, from the Society of Motor Manufacturers and Traders, that arrangements have been made with the South Eastern and Chatham Railway to run special fast trains between Victoria Station and the Palace every week day during the exhibition, as follows:—*Down*, 12.30 p.m. and 4.25 p.m. *Up*, 3.40 p.m. and 6.10 p.m. These trains, which are in addition to the ordinary service, will perform the journey in well under half-an-hour. The Society will have special headquarters during the Show, the Pompeian House having been placed entirely at their disposal by the Palace authorities. This has been luxuriously fitted up, and will form an extremely pleasant rendezvous for those who have business to transact connected with the general arrangements of the Exhibition. The telephone number for this special office of the Society is No. 5 Crystal Palace.

THE CLUB AND THE EXHIBITIONS.

As the result of the widespread dissatisfaction which has been expressed in regard to the action of the committee of the Automobile Club in according the patronage of the club to one only of the approaching Exhibitions for a pecuniary consideration, the following official *apologia* has been published in the club *Journal*, while the correspondence which took place on the subject has been forwarded to us by the Secretary of the Society of Motor Manufacturers and Traders. In a front paragraph we refer both to the statement published in the club organ, to the letters of the Society of Motor Manufacturers and Traders, and to the importance of the subject for the automobile movement generally. No one, we venture to think, will be able to read the correspondence published below without fully endorsing the views enunciated in our leaderette. From the Automobile Club *Journal* of February 4th :—

The Club and the Exhibition Question. On October 17th the committee was approached by the Society of Motor Manufacturers and Traders asking on what terms the club would grant its patronage to their second Exhibition, to be held at the Crystal Palace from February 12th to the 24th inclusive. The committee took the matter into consideration, and after two interviews between the club secretary and the secretary of the Society, which were reported to the club committee, certain terms were put forward to the Society and at the same time to Mr. Cordingley, the committee wishing to grant its patronage to both Exhibitions on precisely equal terms. The terms as put forward were accepted *in toto* by Mr. Cordingley, and were rejected *in toto* by the Society, without leaving any loophole for any further negotiations in the matter. In order, however, that the Society should receive every opportunity of re-considering its position, it having first approached the club in the matter of the club granting its patronage, it was further discussed on several occasions in committee, and eventually the Society, recognising that by the delay the club desired to give them another opportunity of resuming negotiations, addressed a letter, dated January 15th, suggesting that a sub-committee of the Society and a sub-committee of the club should meet to discuss the matter not for this year, but for the year 1905. The above-mentioned letter was discussed in committee on Monday, January 18th, and, having come to the conclusion that the Society was not serious in its first request nor in its subsequent action, the committee decided to grant its patronage to Mr. Cordingley, after having kept him waiting three months.

A Grotesque Misrepresentation. In the light of these facts, the statement in a newspaper—to which Lord Russell draws attention in a letter in the current issue—that the club have given their patronage to the Islington Show for the sake of £500 is seen to be a grotesque misrepresentation. The club throughout these negotiations has been actuated by the sole idea of benefiting the British automobile industry by securing to these annual Exhibitions the support which would have further increased their usefulness. That it should be now asserted by the parties who are responsible for the failure of these intentions that the club has sold its patronage, and that that statement should be credited in certain quarters, are matters that all those who are anxious for the future of the automobile movement will view with mixed feelings of indignation and regret.

The following is the communication issued by the Society of Motor Manufacturers and Traders upon the publication of this statement :—

THE CLUB AND THE EXHIBITION QUESTION.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—The attention of my committee having been called to an article in the Automobile Club *Journal* of the 4th inst., pp. 97-8, wherein it is stated that this Society approached the committee of the club asking upon what terms the club would grant its patronage to their second Exhibition, to be held from the 12th to 24th of February inst., I am directed to forward you the enclosed copy of this Society's letter in question, the wording of which does not, in the first place, justify the statement that the Society merely asked on what terms the club would grant its patronage.

COPY LETTER FROM THE SOCIETY OF MOTOR MANUFACTURERS AND TRADERS TO THE AUTOMOBILE CLUB.

October 17th, 1903.

My committee have asked me to bring before you the fact that the second annual exhibition of this Society will take place at the Crystal Palace from the 12th to 24th February, 1904, inclusive. We have already received entries from the enclosed list of firms, which I think you will admit, constitute the trade in this country.

My committee hope that your club will formally support the show—as being the official trade show of the year—by giving your patronage to it, or such other formal support as is necessary and proper to be given by the leading organisation in this country to the only trade show.

Now we are asking this for the very serious consideration of your committee, and trust that it will be put before them at your next meeting, as the whole industry is passing through a very critical period, and it is most important that it should have the support of the Automobile Club, which support my committee consider that under the circumstances it is fully entitled to expect.

There are no private interests being served by this Society, but it is an association supported by the great majority of the trade, as certainly practically without exception the show is.

It is correct that two interviews then took place between the Club Secretary and the Secretary of the Society, at the second of which interviews the Club Secretary definitely stated the terms upon which the club would be prepared to extend its patronage to the Society's Exhibition. These terms were as follows :—

(1.) Free admission of all Club Members during the Exhibition.
(2.) An annual sum of £500.
(3.) Agreement by the Society not to hold trials, &c.
(4.) Representation of Club on the Show Management Committee.

It will be observed from the nature of the conditions themselves that the intention was to extend the patronage to the Society's Exhibitions generally, and not limit it to any one particular Exhibition.

These items were duly reported to the committee of this Society, at its next meeting, which was on the 19th November, 1903, and the same being unanimously considered impossible of acceptance, the Secretary of the Society was directed to write to the Club Secretary as follows :—"November 20th, 1903. The subject of our recent interviews was discussed at the committee meeting last night, and I was directed to inform you that my committee regret that they cannot see their way to accept the terms proposed."

On the 14th January, 1904, the next date on which the Society's Committee met, it was decided to write the following letter to the club with reference to future Exhibitions, as the Society was, and is still, firmly of opinion that it is as much its duty to obtain for its exhibitors the patronage of the premier automobile body as it is the duty of the club to extend its patronage on proper terms to the representative Trade Society's Exhibition :—

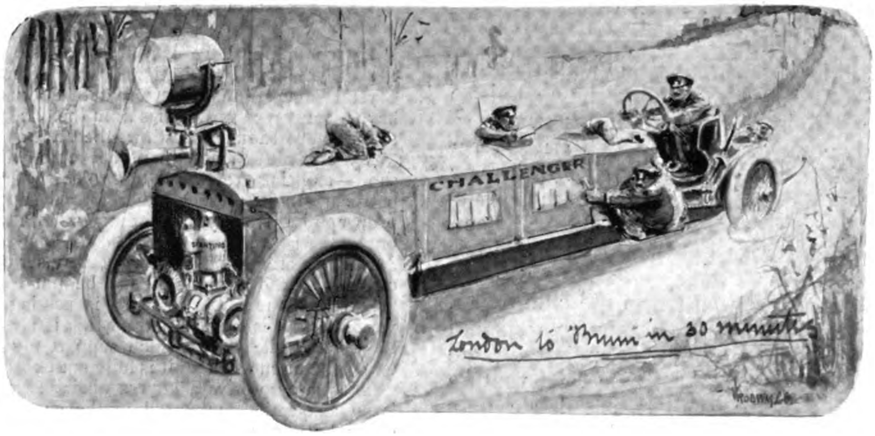
"January 15th, 1904. With reference to the correspondence on the Exhibition question, my committee desire me to inform you that they regret that the terms named by your club were such as to interrupt negotiations in respect of our forthcoming second Exhibition, but in view of the great benefit which would doubtless result to automobilism generally, if the premier Exhibition of this country were 'patronised' by your Institution, my committee would be quite willing to appoint a small sub-committee to meet one of yours for the purpose of discussing possible terms for the Society's third Exhibition."

This letter has never been replied to, nor is it known to this Society on what ground the Editor of the Automobile Club *Journal* presumes to say that the club committee came to the conclusion that the Society was not serious in its first request nor in its subsequent action, and, therefore, decided to grant its patronage to Mr. Cordingley's Exhibition, after having kept him waiting three months.

I am, Sir,
Your obedient servant,
T. F. WOODFINE, *Secretary.*

* * *

THE Chief Constable for East Sussex has been provided with a motor car by the Joint Committee at a cost of £350. Motorists will learn with mixed feelings that the cost of this machine has been defrayed out of the fines inflicted on motorists in the division. It is rather too bad that police officials should be provided with such a direct incentive as this for laying motor traps, but perhaps as they become automobilists they will themselves grow more reasonable and considerate.


CHALLENGER
London to 'Brum in 30 minutes

THE MIDLAND AUTOMOBILE CLUB.—This picture appeared on the menu of their annual dinner on Saturday last.

Midland Automobile Club.—On Saturday evening last the Second Annual Dinner of this Club was held at the Grand Hotel, Birmingham, when Mr. W. Ballin Hinde, one of the Vice-Presidents, occupied the Chair. Amongst others he was supported by Messrs. Vernon Pugh, H. Barnsley, P. V. Vernon, Meredith, O. Harmer, Milburn, G. Dennison, N. F. L. Hemmings, S. H. Pinsent, F. W. Rainforth, E. M. Instone, Bullock, F. Lanchester, A J. W. Millership, C. P. Type, T. C. Aveling, H. Holder, H. B. Graham, A. J. Johnson, E. C. Lord, J. Wingfield, Harper, A. A. Remington, Windsor, A Whitfield, J. Whitfield, C. H. Palethorpe, H. Austin, W. E. Rogers, C. S. Baynton, F. Baynton, W. B. Davies, G. A. Cox, W. T. Stokes, W. H. C. Wood, &c. The Royal toast having been duly honoured, the toast of the "Visitors" was proposed in the happiest manner by Mr. C. Vernon Pugh, a characteristic response being given by Mr. Percy. Following this, a very interesting little episode was enacted by the presentation to Mr. Frank Lanchester, the late indefatigable honorary secretary to the club, for the services which he had rendered during his occupation of that office. The toast of "the Club" was then proposed by Mr. Barnsley, and acknowledged by Mr. T. C. Aveling, honorary secretary. The "Automobile Club" was given by the Chairman, the response being placed in the hands of Mr. Rees Jeffreys. During the evening some excellent music and songs helped to enliven the night's entertainment between the various toasts.

The Berkshire Automobile Club.—On Friday, February 5th, the Berkshire Automobile Club held their inaugural dinner in the Great Western Hotel, Reading, when the chair was occupied by Sir Gilbert Clayton-East, Bart., about 35 members of the Club and guests being present.

RACES, RECORDS, AND TRIALS.

GORDON BENNETT ITEMS.

There will probably be about nine neutralised stretches on the Taunus course, including Usingen, Weilburg, Limburg, Esch, Kœnigstein, Dornholzhausen, and the Saalburg. The time allowed for these on each tour will be about 70 minutes, making for the four tours of the race about 4½ hours. Allowing about 6 hours for actual racing time, this gives about 10½ hours from the start to the finish.

The Lüneburg Circuit, where it is hoped to run off the German eliminating trials, is about 61·60 kiloms. in length, starting from Soltau. This will be covered probably five times.

Inspection of the revised route for the Belgian-Ardennes Circuit has created a favourable impression. The new portion is reported to be superior to the rest of the circuit, and will increase the distance available for racing. The outer circuit will measure 126 kiloms., and the cross road in the centre will bring the entire length up to 154 kiloms.

Baron de Caters, almost immediately after Mons. Gobron issued his challenge to Mr. Vanderbilt to run his Mercedes in France under the auspices of the A.C. de France against a Gobron-Brillié car, expressed himself desirous of taking up the challenge with his new Mercedes by the end of February, in the absence of Mr. Vanderbilt from Europe. This, however, is not at all what Mons. Gobron desires or suggested. He points out in reply that his challenge is to Mr. Vanderbilt personally, in view of what appears to him the recent extraordinary performances in Florida.

The Anti-Skid Trials of the A.C. Seine-et-Oise, which commence at Versailles on February 24th, are already receiving a number of adherents, and it will be interesting to see a comparison of the rapidly increasing anti-skid devices which are coming upon the market. Already thirteen different devices are entered, and the contest promises to be keen. A total of 740 kilometres will be traversed, spread over five days, starting from Versailles each day.

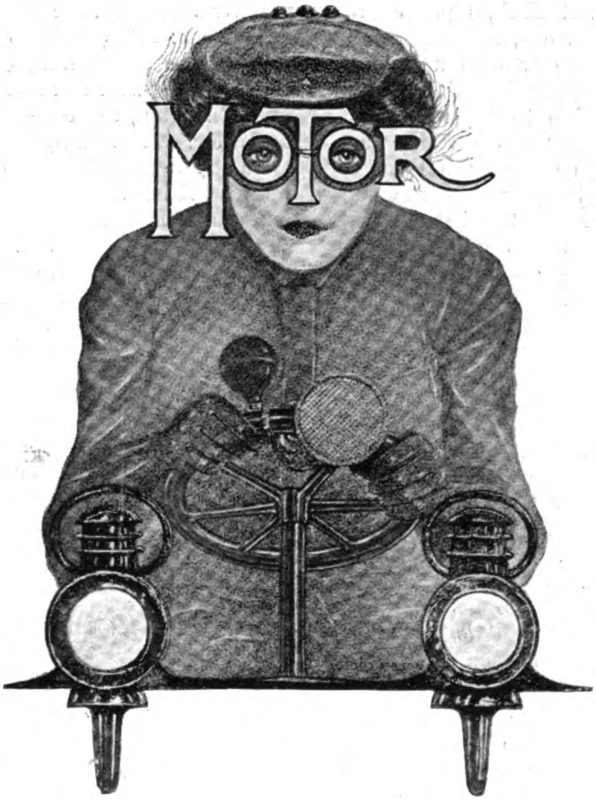
The motor boat races, which are to take place during the Kiel Regatta week on June 25th, promise to be very popular. The Emperor will personally be present at the races, and the boats will be divided into six classes, viz.:—

Class 1.—Boats from 18 to 25 metres in length with no limit to motor power.
Class 2.—(*a*), 12 to 18 metres long, no h.p. limit. (*b*), 12 to 18 metres, 100-h.p. maximum.
Class 3.—(*a*), 8 to 12 metres, no h.p. limit. (*b*), 8 to 12 metres, 50-h.p. maximum.
Class 4.—6 to 8 metres, 30-h.p. maximum.
Class 5.—(*a*), 6·50 metres and under, 16-h.p. maximum. (*b*), 6·50 metres and under, 6-h.p. maximum.

Mr. Pollock will read a paper on "Aeronautics and Ballooning as a Sport" at the Automobile Club next Thursday evening.

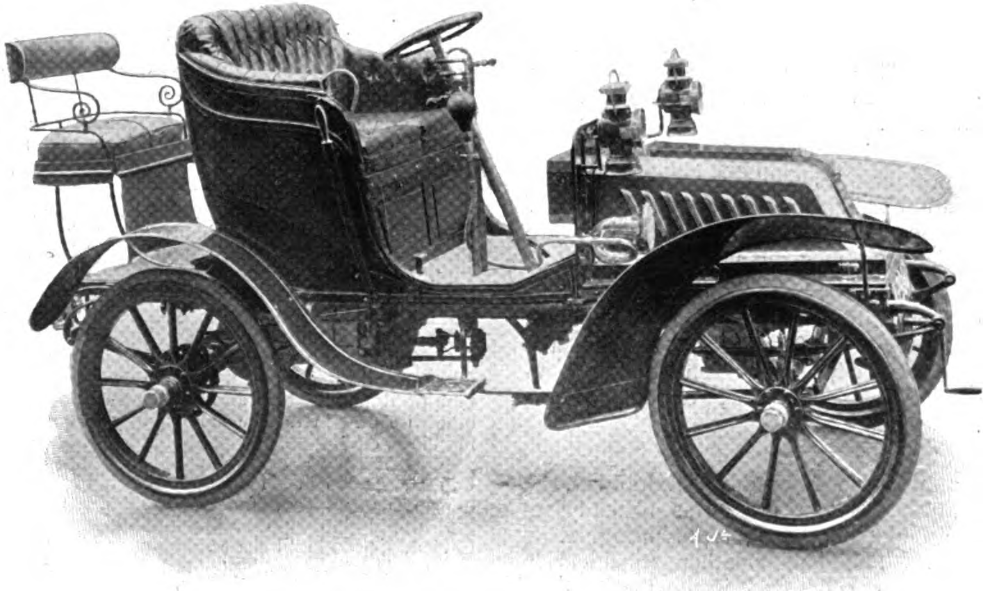
A PRIVATE track suitable for the side slip trials of the Automobile Club has been lent for the side slipping tests. The last day for entry is the 29th of this month, by which time drawings of the devices to be submitted must be sent in. A first prize of £100 minimum will be awarded if the best device is considered worthy, other prizes being allotted according to the merits of the devices in the opinion of the judges. The trials will take place about March 25th.

WE learn that the first of the motor coaches built by the North-Eastern Railway Company underwent a very satisfactory official trial run of 60 miles on the main line on Thursday, the 28th ult. This coach was described by us in our issue of January 23rd, when we gave an illustration of the 80-h.p. Wolseley petrol engine, coupled to the dynamo from which the power is transmitted electrically to the motor driving the wheels. The run was made without any hitch, at an average speed of 30 m.p.h., including four stops and re-starts. The speed attained was frequently nearly 40 m.p.h., and the coach had no difficulty in climbing a 1 in 95 bank on each journey. It weighs about 35 tons, and the fuel consumption works out approximately at one pint per b.h.p. per hour.



An original front-page design of "Motor" (U.S.A.), for the February issue of that Journal.

THE Electromobile Company invited a number of the automobile and general press to inspect their well appointed and extensive new garage at Curzon Street, Mayfair, on the afternoon of Monday last. The company has now 60 electromobiles of the brougham type (on the Contal system) in daily use, and is doing a large business both in hiring out vehicles for longer or shorter periods, and in supplying customers with these attractive town carriages. Interesting demonstrations were given of the rapidity with which the system adopted by the company enables the batteries of the carriages to be detached and replaced. The garage and charging arrangements of the company were inspected by those present, who were impressed with the degree to which the increased business of the company gives evidence of the growing popularity of the electromobile in the Metropolis.



Flexibility in the springs is one of the features of the new light De Dion 6-h.p. Cars, and this particularly adapts them for use with solid tyres. The vehicle, which we illustrate, was accordingly fitted with 2½ by 28-inch solids, on which it has been run a considerable distance, and has, we understand, given every satisfaction.

THE enormous degree to which the modern automobile extends the power of the individual (for to go from place to place as you will is after all one of the highest and most satisfactory exercises of power) is well illustrated by the fact that Mr. H. R. Kirk, a prominent automobilist of Headingley, near Leeds, actually drove comfortably from Paris to Monte Carlo on a 24-h.p. De Dietrich car in four days. On the first day of the outward journey he ran from Paris to Dijon, on the following day Lyons was reached, the third day saw him at Avignon, and on the fourth day he ran through Cannes to Monte Carlo. Similar long stages were made in coming back, Valence being reached the first day and Dijon the second. The Channel was crossed from Boulogne to Folkestone, and the run completed back to Leeds in the most satisfactory way. Mr. Kirk appears to have bad no breakdowns or serious mishaps, and it is in the pure joy of his heart that he has written a short appreciation of his tour.

AN excellent show of automobiles and cycles was got together last week in Liverpool, at the St. George's Hall. The chief exhibitors were the Road Carrying Company, Limited, who had a very large selection of different makes of motor vehicles, including the following: Daimlers, Georges-Richard Brasiers, Léon Bollée, Lanchester, Siddeley, Oldsmobile, &c., a variety appealing to all classes of the public. Alldays and Onions were also prominent in their display, other exhibitors including Robinson and Price, Limited, the Star Cycle Company, Rudge Whitworth, William Lea, who made a speciality of Darracq cars and Werner motor bicycles; the Belsize Motor Car and Engineering Company, Limited, who exhibited specimens of their well-known Belsize vehicles; Francis Weighill, who staged some Ader cars; the Hercules Motor Wagon Company, who exhibited their patent steam wagon, which gained the highest award at the Royal Lancashire Show last year. Dunlop motor tyres were in several directions in strong evidence, and some fine specimens of motor tyres were shown by the North British Rubber Company, Limited. The popular element was catered for by a strong feature being made of the Spencer airship, which was suspended from the roof of the building. An excellent programme of music throughout the Show was contributed by the Carmen Sylva Ladies' Orchestra.

IN New York a Mercedes Club is being formed, a necessary qualification being the possession of a car of this make. The leading American millionaires are named as already having joined this new club.

An analysis of the exhibits at the Brussels Salon gives a total of 100 cars, 38 chassis, 86 motors, 7 motor boats, 111 motor bicycles, 4 heavy motor vehicles, 5 steam vehicles, and 2 electric vehicles. Last year only 78 cars were exhibited.

LAST Saturday the Turin Automobile Exhibition, the first of its kind ever held in Italy, was formally inaugurated by the Duke of Genoa, representing King Victor Emmanuel. The bad weather considerably militated against the event, but once inside the building an excellent show of machines repaid those who had braved the elements. Italian exhibits predominated, there being 40 Italian cars represented against 31 of foreign manufacture. In the latter the French were most strongly represented, other countries exhibiting being Austria, Germany, Belgium, Switzerland, and America. England, unfortunately, was unrepresented in the Show. The finest exhibit was that of the Fiat, and, by way of a popular attraction, the Renard train had been imported from Paris. A number of conferences and fêtes form part of the programme during the Exhibition, which closes on the 21st inst., whilst practical trials have not been forgotten, these including brake trials, reliability trials, &c. Every help has been given by the Government to the organisers of this fine Show, the enthusiasm both of King Victor Emmanuel and his Royal wife for automobilism having set an example of encouragement to official Italy generally. In our frontispiece we reproduce a photograph of the King and Queen of Italy in one of the King's automobiles, of which he is making almost continuous use.

M. ANDRÉ A. GODIN notifies us that owing to the growth of his business in Ducellier motor lamps he has now taken new premises at 1, Red Lion Square, which will be in perfect working order within the next three or four weeks. Under his new arrangements M. Godin will not only be able to keep a much more extensive range of stock, but he has provided for charging accumulators on the premises.

IN order to make room for new season's patterns Mr. Oscar C. Selbach announces that he is prepared to concede a considerable amount in the price on a small number of 3-speed Regal cars fitted with Aster or De Dion engines.

MR. STANLEY W. ANDREWS, late Works Manager of the Motor Traction Company, Limited, has opened offices and showrooms at 203, Regent Street, W., where he will make a feature of his Stanley Silencer in addition to conducting a general motor business in cars and accessories.

MESSRS. H. B. NELSON AND CO,, of 7, Harrington Road, South Kensington, have opened a free garage for cars at the above address. Repairs and renewals can be executed on the premises, a source of revenue no doubt which will help to recoup the firm for their new departure.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Auto-Cars and Accessories (Limited), 114, Long Acre, W.C.—Capital, £200 in £1 shares (100 preferred and 100 deferred). First directors, J. Portwine, J. Weller, and H. E. Weller.

A. D. Barnett (Limited).—Capital, £8,000 in £1 shares. Object, to carry on the business of manufacturers of and dealers in motor cars, cycles, velocipedes, &c.

Buchholtz Reversible Turbine Syndicate (Limited).—Capital, £100,000 in £1 shares. Object, to adopt an agreement for the acquisition of patent rights in the Buchholtz Reversible Turbine or Rotary Motor; also to manufacture, sell, let on hire, or otherwise deal in turbine motors, bicycles, boats, launches, flying machines, &c.

A Donaldson and Co. (Limited), (Scotch Company).—Capital, £3,000 in £1 shares. Object, to carry on the business of manufacturers, &c., of motors, motor cars, launches, cycles, &c.

Pioneer Motor Car Company of India (Limited).—Capital, £5,000 in £1 shares.

Powell and Hanmer (Limited), Chester Street, Aston-juxta-Birmingham.—Capital, £50,000 in £5 shares. Object, to acquire the business of manufacturers of lamps and cycle accessories carried on at Chester Street, Aston-juxta-Birmingham, under the style of Powell and Hanmer, and to carry on the business of manufacturers of motor lamps and motor accessories, &c. First directors, F. Powell and F. Hanmer.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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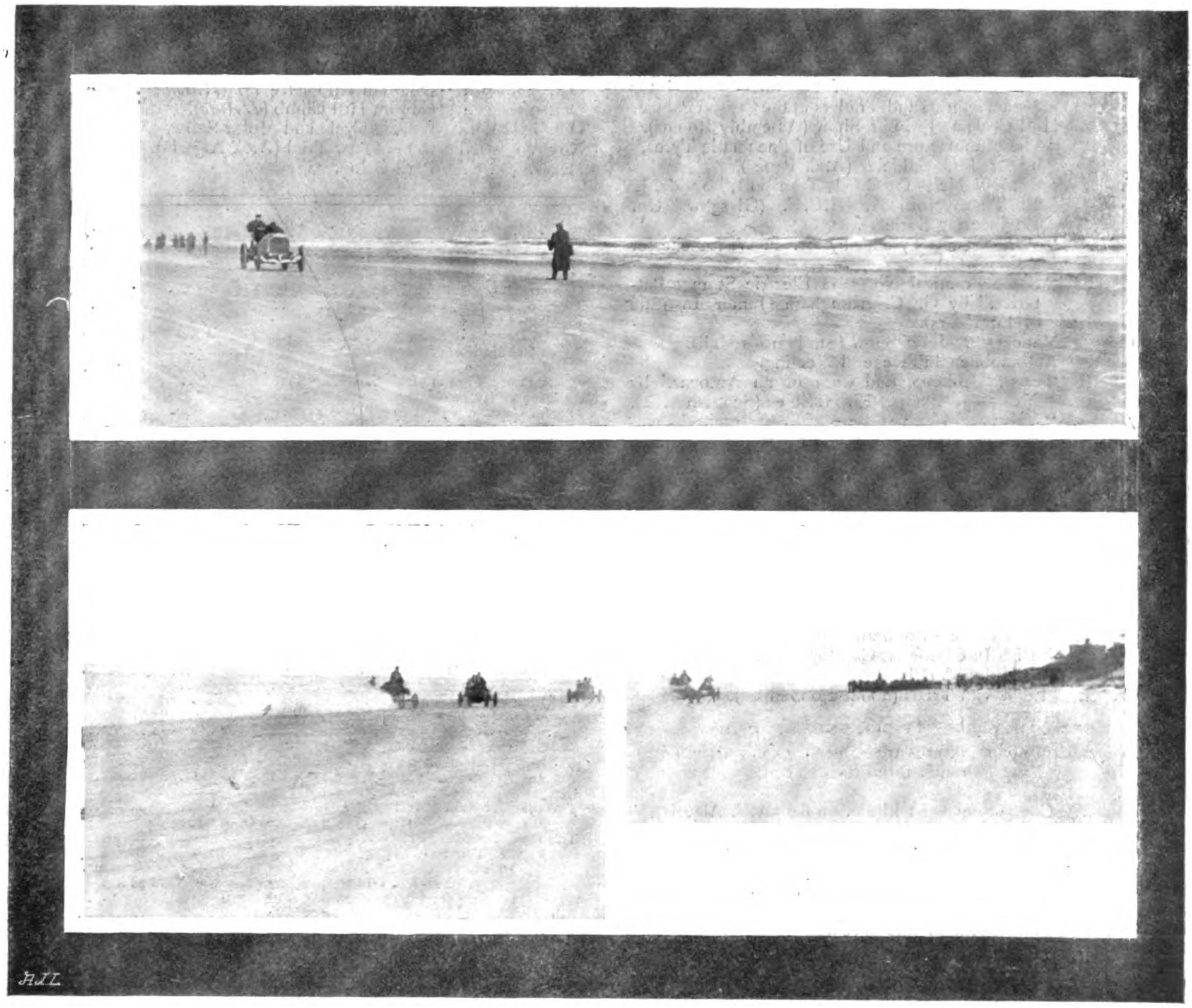

ORMOND-DAYTONA BEACH RACES.—In the above photographs we reproduce pictures of the remarkable record races held recently on this Californian Beach, and which were reported by us in our issues of January 30th and February 6th. The top picture shows Mr. W. K. Vanderbilt, junior, on the 90-h.p. Mercedes making his record of 39 secs. for the mile, equal to 92·30 m.p.h. In the lower picture is seen the 5 miles race for gentlemen drivers, which Mr. W. K. Vanderbilt also won in 3 mins. 34⅖ secs. He beat this time for 5 miles later in the day by 3⅘ secs., equal to 85·50 m.p.h.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Feb. 12-24 ...	2nd Annual Exhibition of the Society of Motor Manufacturers and Traders at the Crystal Palace.
Feb. 23-27 ..	Hull Cycle and Motor Show (Assembly Rooms).
*Feb. 25 ...	"The Manufacture and Use of Pneumatic Tyres," by Mr. J. C. Siddeley (A.C. Paper).
Feb. 25 ..	"Motor Vehicles for Goods Transport," by Mr. J. E. Thornycroft, A.M.I.C.E. (Glasgow Un. Engineering Society).
Feb. 27 .	"Wire Wheels Tyred," by Mr. F. W. Lanchester (Mid. A.C.).
Mar. 4 ..	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7-12 ..	Manchester Motor Show (St. James's Hall).
Mar. 10 ..	Automobile Club General Meeting.
Mar. 15 ..	"Cost, Up-keep, and Care of an Autocar," by Messrs. J. Adam and J. H. Steen (Scottish A.C.).
*Mar. 17 ...	"Valves and Valve Mechanism of Internal Combustion Engines," by Mr. R. E. Phillips, M.I.M.E. (A.C. Paper).
Mar. 19-26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24 ...	Smoking Concert.
Mar. 25-30 ...	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May ...	British Gordon-Bennett Race Eliminating Trials.
May 19-20 ...	Glasgow-London Non-Stop Run.
June 1-7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.-Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Feb. 21 ...	Coupe Sneyden 1 kilom. on flat (A.C. Algeria).
Feb. 23-27 ...	Anti-Skid Trials at Versailles.
Feb. 29-Mar. 5	Cleveland Show.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 3, 4, 5 ..	Fuel Consumption Trials (*L'Auto*).
Mar. 6-12 ...	Buffalo Show.
Mar. 13-20 ...	Cannes Automobile Week.
Mar. 14-19 ...	Boston Show.
Mar. 15-16 ...	A.C. America Commercial Vehicle Trials.
Mar. 19-27 ...	Frankfort Exhibition.
Mar. 20-29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21-26 ...	Washington (U.S.A.) Auto Show.
Mar. 23-27 ...	Electric Vehicle Trials (*Monde Sportif*).
Apl. 5-15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16-May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan Motor Boats).
Apl. 18-23 ...	Nice-Rome.
May 8... ...	Exelberg Hill Climb (A.C Austria).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 1-12 ...	A.C. Bordelais Automobile Fortnight.
May 11-15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12-15 ...	Tours Tourist Trial.
May 14-15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16-23 ...	Circuit National Belge.
May 23-31 ...	Aix-les-Bains Week.
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16-17 ...	Ostende Motor Boat Races.
July 17 ..	Antwerp-Ostende Motor Boat Run.
July 18-23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23-25 ...	Lucerne Motor Boat Races.
July 23-Aug. 5	Spa Automobile Fêtes.
Aug. 5-11 ..	Paris-Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup
Aug. 13 14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Aug. ...	Paris Industrial Vehicles Trials (A.C. France).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14-22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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PASSING EVENTS.

An Important Speech.

IT has been said with some plausibility that were London to be destroyed by an earthquake the survivors would meet and hold a dinner among the ruins to commemorate the event. At any rate, every public function of importance is in this country commenced by a dinner or lunch, and the Crystal Palace Exhibition was opened as consecrated by time immemorial usage in this way. Luncheons dispose to eloquence, and after the lunch was over a number of humorous, important and suggestive speeches were delivered in reference to the Exhibition, and the present and future prospects of automobilism. We have already said that the Exhibition itself is the most important automobile show that has been held in the British Islands, and its importance has been evidently recognised by the managers, who were successful in providing one of the most interesting team of speakers who ever delivered speeches at an automobile function. There were not only the redoubtable Colonel Saunderson, who is one broad laugh in himself, and the Lord Justice Clerk of Scotland, whose dry remarks were punctuated by frequent laughter, but the Postmaster-General, Lord Stanley, delivered a breezy and suggestive speech on the general situation of automobilism both as a pastime and as an industry. Lord Stanley was trenchant and to the point, and it is satisfactory to find a Minister of his prominence so evidently sincerely anxious to do all that he possibly can to promote the welfare of the movement. With the statesman's insight he at once put his finger on the weak spot — the trouble which is threatening to become, unless quickly averted, a serious menace to the progress of automobilism. After some humorous allusions to his recent experiences at the military manœuvres, and the statement of his conviction that the future military organisation of the country was closely bound up with the development of the automobile, Lord Stanley proceeded to deal with the policy and position of the Automobile Club. Lord Stanley's attitude was frankly critical. He recognised to the full the important position of the club and the extent to which it should continue to be in a position to advise, direct, and control the movement in the future as it has done in the past. But Lord Stanley made no secret of his conviction that the recent policy of the club was prejudicial to the movement, and he, very naturally, contrasted its management and behaviour with the institution which one naturally thinks of in the same connection—the Jockey Club. Lord Stanley was most emphatic in enunciating his firm belief that the management of the Automobile Club will require to be totally revolutionised if it is to regain the respect and consideration, both of all automobilists and of the public generally, which it has enjoyed, and deservedly enjoyed in the past.

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A Justification of our Attitude.

IT is satisfactory to find public men of the calibre and importance of Lord Stanley taking a view of which we were at first, and in the automobile Press, at any rate for some time, the solitary exponents. Gradually other papers have fallen into line with ourselves, and have come to recognise that the main danger to the automobile movement at present is not popular dislike, the hostility of local authorities, or the indifference of the Government, nearly so much as the change in policy and loss of prestige which has been the outward and visible sign that the management of its leading body, the club, has fallen into the hands of a small junta, who are conducting its affairs very largely on short-sighted and ill-considered lines. The speech of Lord Stanley affords the strongest evidence that the correctness both of our arguments and our position is being generally recognised in unprejudiced automobile circles of position. The club has been a power for good, and a potent instrument of progress in the past. What it has been in the past it can again become. We hope to see it do so as speedily as possible, and our criticisms have been directed to attaining this end, and to this alone.

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Reformation Needed.

FOR the club to regain its former position, however, for it to command the universal respect of the general public, to be regarded as a wise guiding and controlling force by all automobilists, and for it to enjoy the friendly consideration of Government and even local authorities, it is but too plain that those who have been mainly responsible for the conduct of its affairs recently must give place to others possessed of wider views and a greater amount of tact. It is not as if merely one blunder, or even two, had been committed during the past year. The administration has been one melancholy succession of blunders and mistakes, and the executive committee, which has been practically solely responsible for the main actions of the club, have not merely made blunders, but have inaugurated and stoutly maintained a policy which is bound to be subversive of the prestige and dignity of the club and of necessity calculated to impair its reputation for impartiality. We need not recapitulate the counts of the indictment which we have brought in former numbers of THE AUTOMOTOR JOURNAL. It is sufficient to again point out that for the errors, to which in the interests of the movement we have felt compelled to draw attention, the present executive committee has been almost entirely responsible.

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A Plan of Action.

THE executive committee is elected from the general committee, and once so elected, according to the club rules, it may, apparently, do as it likes. It *may* consult the club committee, if it desires, on any point, but it is not bound to do so. The policy of the club and the conduct of its affairs consequently are, to all practical intents and purposes, in the hands of the executive committee, and to ensure a capable executive committee, the only course which the members of the club can adopt, is to see that only capable men are appointed on the general committee. In our last number we suggested that the members of the club would do well to elect a fresh committee at the annual election now about to take place. In another column we reproduce a letter which was in the first instance sent to our contemporary the *Car*, by a member of the club of long standing, who, we understand, possesses exceptional knowledge of its inner working and management. He puts forward an alternative list of club committee members. We understand that the gentlemen named would be willing to serve. Taking this list as a whole, there is no question of their capability, or of the respect which their position and attainments would confer upon the club, should it be successful in securing their services. Should the majority of the gentlemen proposed be elected, the Duke of Sutherland, K.G., has signified his willingness to rejoin the club and act as president, while Lord Stanley, M.P., would also be prepared to accept the post of vice-president.

It is greatly to be wished, therefore, that all progressive members of the club will be careful to ensure the election of the members put forward by "an old member," or of other new members of similar standing and capabilities. The proposed members will, we trust, be duly nominated and their names sent out accordingly on the voting papers. All members who desire to see the Automobile Club restored to the position of influence which it formerly occupied, and be again in a position to benefit the industry as it has done so frequently in the past, and who are anxious to see its affairs conducted with tact and good sense, will, we are convinced, best attain these objects by voting for the list of committee candidates which appears in another column.

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Not a Private Matter.

In the case of any ordinary club, we should feel diffident in putting forward suggestions about its internal management or proposing such a wholesale and sweeping change as the election of practically a new committee. But the position of the Automobile Club renders it, to a large extent, a public institution, and with its successful management is bound up, to a large extent, the progress of a great industry. At one time it was the only responsible association of automobilists in the country. Even still it is by far the largest, most powerful, and most influential. Its management, therefore, is a matter of concern to all automobilists, whether actually members of the club or not, and every automobilist should be interested in doing what he can to ensure that the management of the club is placed in strong, tactful, and capable hands. Much more so is it the interest and duty of such automobilists as are actually members of the club.

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An Important Hint to all Drivers.

The main reason why Lord Stanley desired that the prestige, influence and dignity of the Automobile Club should be increased, will commend itself to everyone interested in automobile progress, and anxious that more liberal legislation should be introduced when the present three years' Act has expired. Lord Stanley's view is—and it is a view shared by all unprejudiced observers—that though 19 drivers out of 20 drive along the roads carefully, as they ought to do, all the good that their consideration effects is discounted by the twentieth man, who is known to be a rough, and tears recklessly along regardless of others. Should the dignity, prestige, and consequently the power of the Automobile Club increase adequately during the next three years, it should be in a position, Lord Stanley evidently thinks, to stop this kind of thing as effectively and immediately as the Jockey Club stops dishonest practices on the Turf. Lord Stanley is evidently of opinion—and as a member of the Government he is in a position to know—that the prospects of reasonable legislation, when the time comes, will be greatly increased if the Government of the day feel that the Automobile Club is a body not only willing but also in a position to stop abuses of the kind to which we refer, and is determined to do so. This is one among many reasons why Lord Stanley desires to see the club management reformed, and why all who have the interest of automobilism at heart should desire it also.

An Unexpected Result.

Probably few people know much about Tisbury, in Wiltshire, but it has made a gallant attempt to spring, if not into fame, at any rate into notoriety. The local wisdom, as embodied and represented in and by the District Council, are, as is, alas, too often the case, extremely hostile to the automobile movement, and as their roads and lanes happen to be rather narrow, this body thought that they provided an excellent opportunity for an attempt to suppress the new locomotion, as far as the important neighbourhood of Tisbury is concerned. So they have petitioned the County Council to petition the Local Government Board to declare the roads in and about Tisbury unsuited for motor cars, and to prohibit them accordingly. It is very unlikely that the Local Government Board would have acceded to this reactionary request, but the local ratepayers will probably feel very much annoyed with the wise men they have elected to represent them on the District Council for forgetting the old Highways Act of 1835. We have already drawn attention to the fact that this Act empowers Justices to have highways of inadequate width widened to a breadth of 30 feet at the expense of the local ratepayers who provide the highway rate. A local automobilist living in the Tisbury district has accordingly asked two Justices of the Peace with whom he is acquainted to view the roads on which the local wiseacres wished to prohibit motor car traffic, and this the Justices have done, with the result that they have felt it to be their duty to issue an order to the District Council to have the roads widened up to a breadth of 30 feet. The District Council will have to "recompense" the landowners for whatever land may be taken to widen the road, and the Justices' order enjoins the District Council to charge the amounts required to the local rates, which will probably have the effect of raising them considerably. This is unquestionably the right tactics to adopt where local authorities are so reactionary as to attempt to make the narrowness of their roads a ground for restricting locomotion. It is quite preposterous that traffic is to be accommodated to roads and not roads to traffic. We fancy, however, that there will be "wigs on the green" at Tisbury when the sapient District Councillors come to confront the ratepayers, who will have to pay the piper for their reactionary proceedings. We trust there will be, and that the result may be to warn other similar reactionary rustic bodies that to this extent, at any rate, the Highways Act is a weapon with two edges.

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The Deadly Horse—From Another Point of View.

The recent discussion at the Sanitary Institute provides what must be unpleasant reading for those patrons and supporters of the horse who regard him as the only proper means of road traction. They have, of course, always been in the habit of slurring over the many accidents, fatal and otherwise, for which the horse is responsible in the course of the year, affecting apparently to regard them as part of the divinely instituted order of Nature which it approaches blasphemy to complain of. They will not be able to take quite this line, however, as regards the indictment which Dr. Louis Parkes, the eminent authority on sanitation, brings against horse traction as seriously deteriorating the healthiness of our cities. Mr. Parkes is convinced that the evidences of the horse's presence on our streets, which it is unpleasant to specify in too great detail, are when dried, pulverised, and blown about by the wind, a fruitful cause of nasal catarrh, follicular tonsilitis, conjunctivitis, pneumonia, and other diseases of the respiratory organs and passages too numerous to mention. The fact that last year, which was a particularly wet year, was also a particularly healthy one, is attributed by Dr. Parkes to the fact that the unsavoury material to which we refer seldom became sufficiently dried and pulverised to produce its deadly effects. When the opponents of the new locomotion begin to recognise that the long list of accidents are not the whole of what we have to thank the horse for, but that we may attribute the long-named diseases mentioned by Dr. Parkes to him as well, they will probably be on the high road to conversion, particularly when they bear in mind that with the universal adoption of automobilism in our large towns these unpleasant diseases would, in Dr. Parkes's opinion, in all probability disappear.

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The Prospects of the Motor 'Bus.

THE motor 'bus is a long time making its appearance on the London streets. The Road Car Company have made several experiments in this direction from time to time, hitherto they have not been satisfied with the results, but it is evident that their most recent experiments have been fairly satisfactory, for at the last shareholders' meeting, the Chairman made bold to say that he hoped very soon to be able to confront the shareholders with a perfect motor. The Chairman of the Company is sanguine. We are not in sight of finality in regard to motor car development, and we doubt whether any age will ever be able to boast that it has seen the perfect motor, but, no doubt, what Mr. Moore meant was that it would be perfect for 'bus propulsion, and that is a different matter; in fact, there are plenty of motors that could perform the service needed, and it is one of the mysteries of the situation that motor 'buses have not long ago been a feature of our streets, at any rate in the employment of the Road Car Company, which is apparently more progressive than its rival. We believe the main difficulty has been the question of drivers. A 'bus is a heavy vehicle, and, consequently, requires special skill in starting and changing gears. The drivers who were employed in the motor 'buses that had already been put on the streets certainly gave the most convincing evidence of their incapacity to manage their vehicles in these important respects. We are glad to find the Chairman of the Company firmly of the opinion which we have always maintained, that when the majority of 'buses are provided with motor equipment, they will easily compete with the electric trams, with their expensive system of running, not only on account of the greater economy of running, but owing to the fact that they can accommodate themselves so much better to the varying requirements of road traffic. We sincerely trust Mr. Moore will soon produce his ideal 'bus, for the torments of unfortunate 'bus horses are an anachronism in the present age of self-propelled traffic, exasperating both to the mechanic and those who have the welfare of animals at heart.

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The Exhibition Question in Paris.

THE Chambre Syndicale de L'Automobile exercises a powerful influence in the management of all automobile matters in the French capital. For some time past a tentative proposal has been put forward for holding a second Automobile Exhibition in the autumn. After considering the question in all its bearings and going very thoroughly and fully into the matter, the Chambre Syndicale has come to the conclusion that to permit a rival exhibition to be held in this way would have the effect of diminishing the importance and prestige of the Salon, and has determined, in consequence, to oppose the project of holding any such secondary exhibition. It is interesting to find an important French body taking this view, almost at the very moment when the committee of the Automobile Club has reversed its former policy of refusing to countenance any exhibition until the trade were united on the subject. We commend the decision arrived at by the Chambre Syndicale to the attention of the gentlemen who have been responsible for the change in the policy of the Automobile Club.

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Examples Needed in South Africa.

MR. SILVER's ride through South Africa, which we recently chronicled, has not been altogether as effective in removing prejudice as might have been hoped, for the opinion still seems to prevail there that no gentleman should be seen on a motor bicycle. A correspondent in Johannesburg has very sensibly suggested that a few influential South Africans should take a trip to England and see for themselves the hundreds of gentlemen who own and ride motor bicycles, and no doubt the prejudice would then rapidly disappear. As regards the general aspects of the motor question there are still more difficulties to be contended with, for round many of the towns, our correspondent points out that the roads are not much better than country by-roads in England. In Johannesburg, at any rate, great inconvenience is caused by the "spruit" between the residential part of the town and the business quarters, which after a storm is a rapid stream 3 to 6 feet deep, and is consequently, as our correspondent drily points out, not always convenient for motor cars to go through. We gather there are a good many spruits of this kind, though not always so deep, in South Africa, and it is essential that the vulnerable portions of motor car mechanism in cars designed for the Colony should, in consequence, be built well off the ground. Petrol is also very expensive, the price ranging from *2s.* to *4s.* a gallon, and the transport is often defective, so that some of it gets lost on the way. All these difficulties in the way of the development of automobilism in South Africa suggest that leading English firms would do well to take steps to help to develop organisations in the country which would, at least, provide an adequate supply of fuel, and bring their influence to bear on the local authorities for developing the roads and improving them where possible. It would be worth while for the trade of the United Kingdom to take really serious steps in this direction, for, as we have already pointed out, the growth and popularity of the automobile in South Africa has been abnormally rapid, and with favourable conditions English manufacturers ought to find a very valuable market there in the near future.

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THE Automobile Club have come to the conclusion, after a full report upon the subject, that there is no room for the proposed Institution of Motor Engineers in addition to the present colleges, &c.

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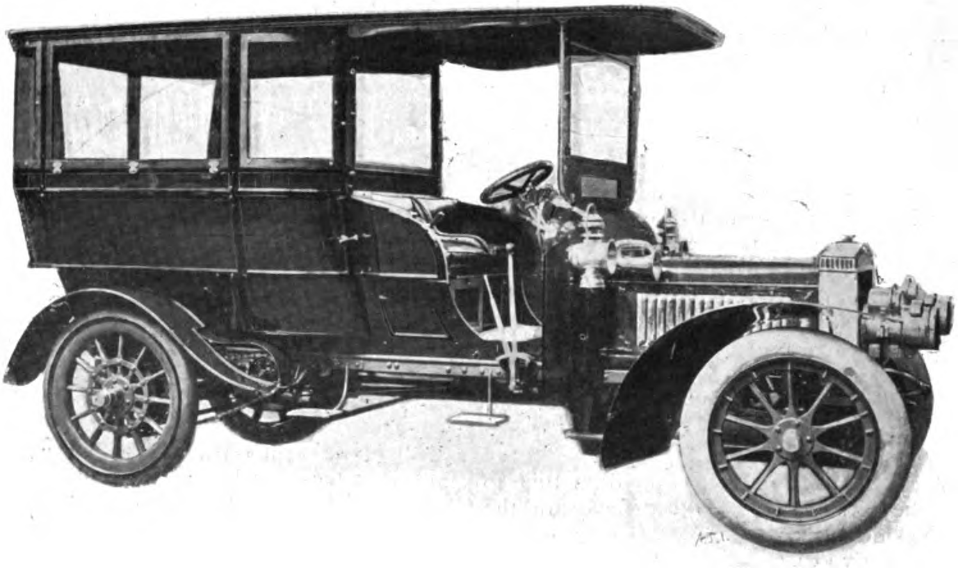
THE campaign of the Paris River Police against the fish poachers still goes on merrily, and a sister boat to that which we recently illustrated, but driven by a petrol motor, is also doing good work in this direction, and is specially efficacious through being provided with a powerful acetylene searchlight.

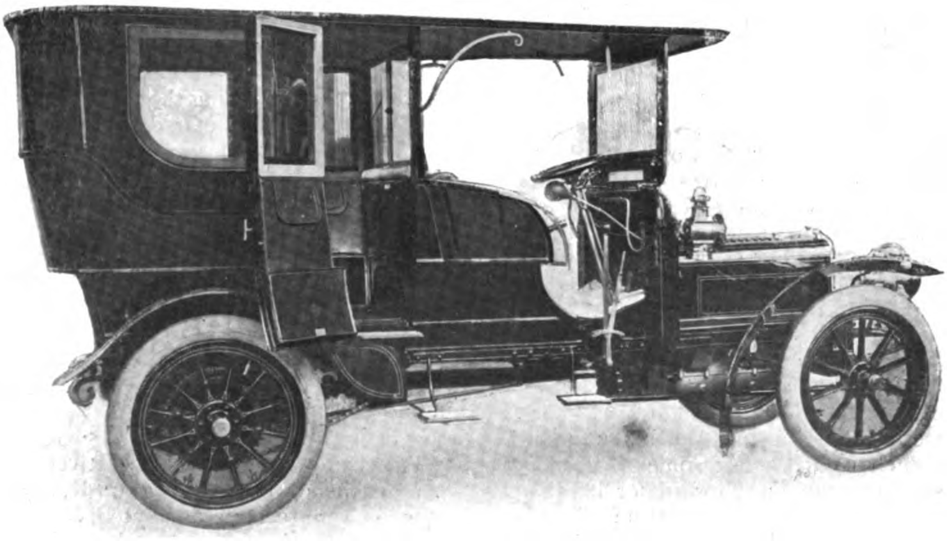
THE CRYSTAL PALACE EXHIBITION.



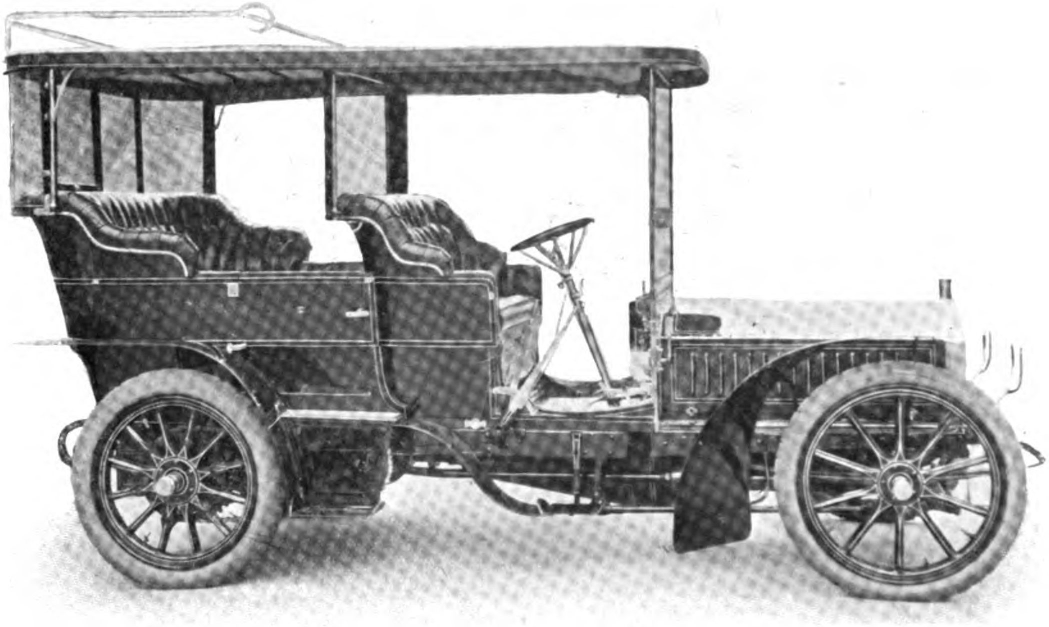
A 28 36-h.p. Daimler, Side-Entrance, Covered Phaeton.

THE Exhibition which is now in full swing at the Crystal Palace, and will remain open until Wednesday next, has fully come up to all expectations, and is proving itself to be the most attractive and representative automobile show which has ever been held, at any rate in this country. The suitability of the Palace for such an event is once again brought prominently forward, for, although the building was apparently filled almost to overflowing last year, and there are on this occasion an even greater number of exhibits, yet it is obvious that room could be found for a still greater number of exhibits if needed. Not only is all available space on the main floor of the building occupied, but the heavy vehicles and marine exhibits fill a large portion of the basement opening on to the terrace, and the corridor leading to the Crystal Palace School and to the low level station also forms an important annexe to the Show. Full advantage, too, is again taken of the grounds and of the hilly roads in the immediate vicinity by many of the exhibitors for giving intending purchasers practical demonstrations of the capabilities of their cars, the suitability of the Palace being still further emphasised in this way.

From a decorative point of view the Show will not bear comparison with the recent Paris Salon, for, being characteristically English, the first impression made upon the visitor is that utility rather than appearance has been for the most part studied. There are, of course, a few exceptions to this, but this is the general rule. In not a few cases more might even have been done by the exhibitor to save the time of the general public by rendering it easier for them to find the particular stalls



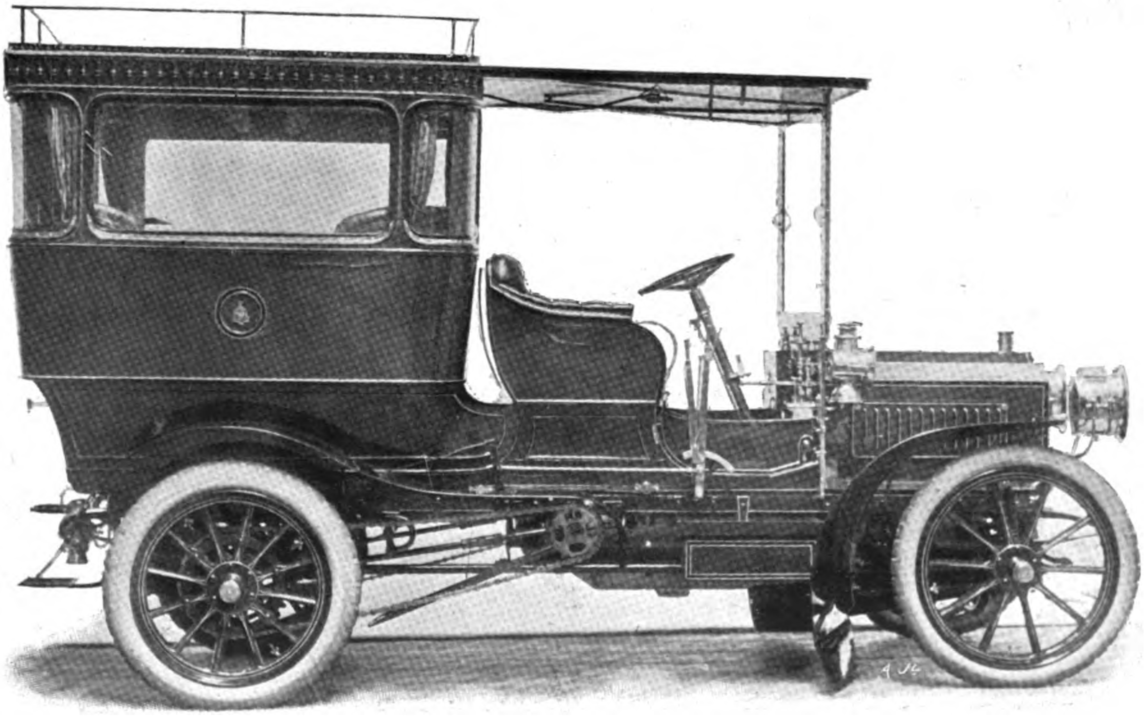
An 18-22-h.p. Daimler, Side-Entrance, Tonneau, with detachable Limousine top.



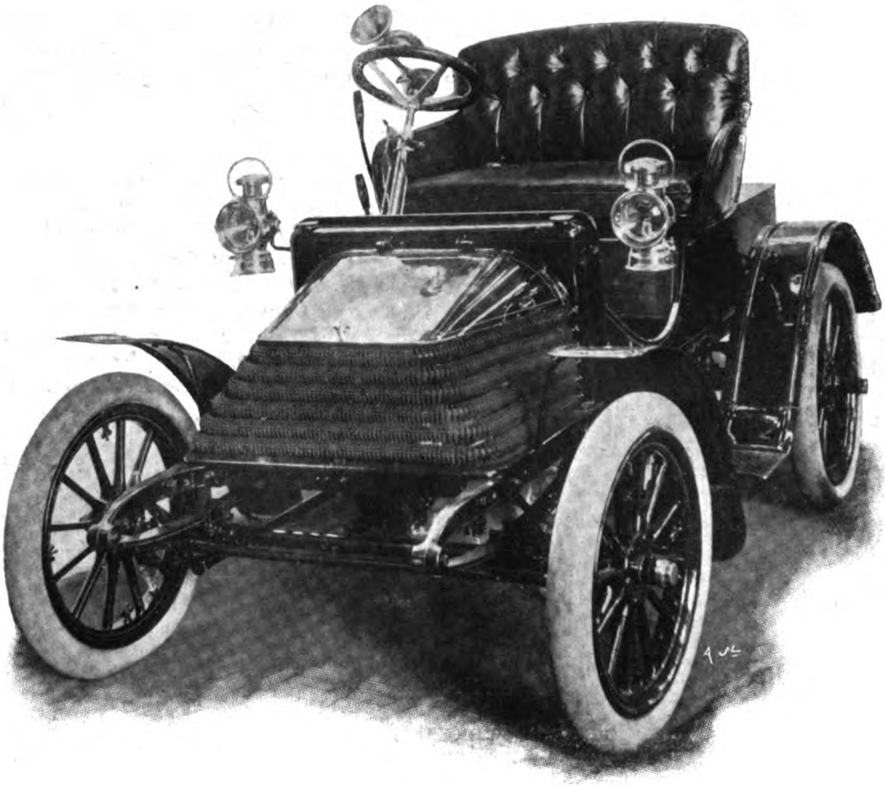
The new 6-cylinder 18-h.p. Napier Car.

which they might wish to see. It would be a good thing if, on future occasions, some systematic means were adopted for displaying on the stalls the numbers allotted to them in the catalogue. We notice, too, that several of the large signs fixed above the stalls are so placed that they could not be seen at all from any distance, this being partly due to the fact that the stands are for the most part long and narrow, and that some of them lie at right angles to those running down the centre of the nave. Considerably smaller signs, differently placed, would in not a few of these cases have been more effective.

The most noticeable fact brought home by a visit to the Show is that enormous progress has been made during the past year, and particularly that English manufacturers have not only increased considerably in number, but that amongst them are many concerns whose work compares most favourably with anything

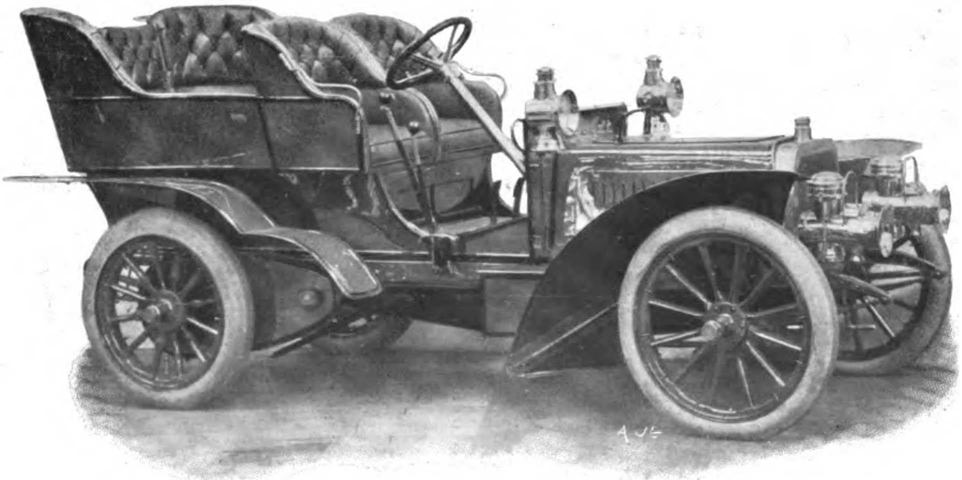


A 24-h.p. Napier "Pullman" Car.

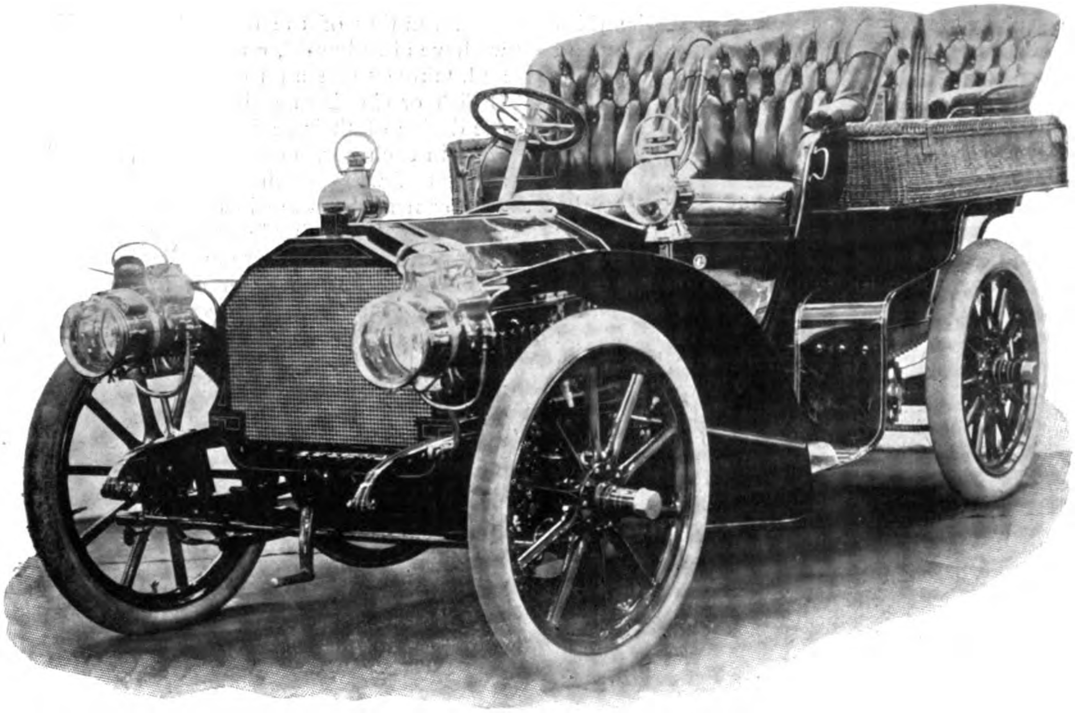


The 6-h.p. Wolseley Light Car.

turned out in other countries. A close inspection of the more important English exhibits amply indicates that in respect of design, material, and workmanship, the automobile problem has received an enormous amount of careful study, and that there is comparatively little evidence of that haphazard work which has been not unnaturally so much in evidence in earlier days. This is partly due to the recognition, by some of our large and old-established engineering firms, that the automobile branch of engineering is likely to prove one of the most lucrative and important. It is also partly due to the natural weeding-out process amongst the smaller firms, by which only those having the necessary special knowledge, and the equally essential mechanical facilities are able to survive and to find an increasing market for their productions in competition with many excellent cars. The advent of the Crossley car, the greater manufacturing facilities of the Napier Company, the valuable work done by the Wolseley Company, the increased field of operations of the Ariel Company, the old-established reputation of the Daimler Company, the high standing in engineering circles of the Thornycroft Company, and the absorption by the Sir Wm. Armstrong, Whitworth Company of the ingenious Wilson and Pilcher car, are all indications of British progress, and are highly encouraging signs of the times. All these firms are well represented at the Show, and their stalls are, naturally, visited by everybody. In all, about fifty English manufacturers of



The 6-cylinder Marston "Sunbeam" Car, with enclosed side chains.

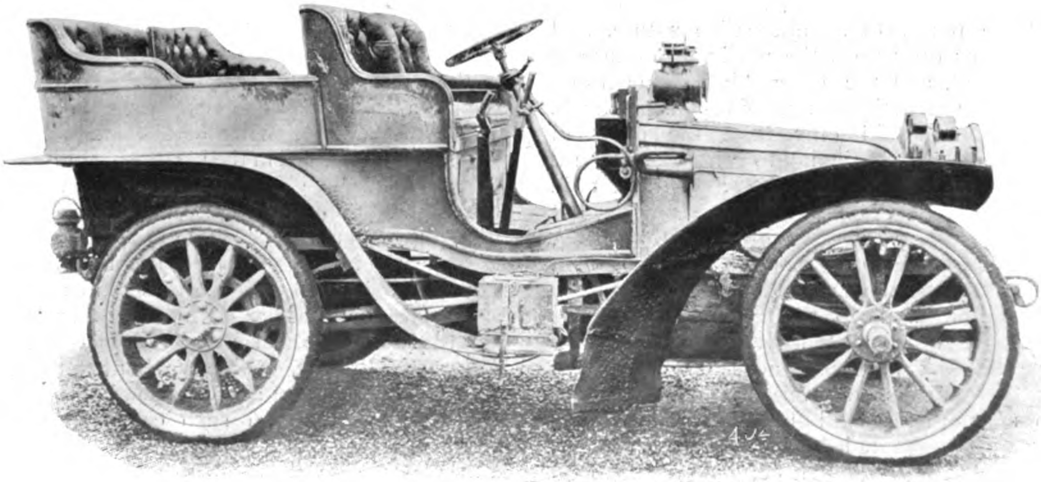


One of the new Crossley Petrol Vehicles.

petrol vehicles have exhibits apart from one or two makers of electric and steam cars, and the best known manufacturers of heavy steam lurries.

The five different types of chassis fitted with six-cylinder engines, which we referred to last week, and a slightly greater number of English chassis having three-cylinder engines are also shown, the latter including the Brooke, Belsize, the "National" (to which we referred as the "Rose" last week), the Ryde, and the Hozier. Amongst new firms who have recently taken up the manufacture of cars in this country—and apart from the Crossley and Siddeley vehicles, which we have already described—may be mentioned Messrs. Lee and Francis, of Coventry, the Patent Automatic Feeding Machine Company (the Dougill car), the Ryknield Engine Company, the Ryde Motors Ltd., and the Standard Motor Company; the two first mentioned of which have developed entirely new systems, and their productions are attracting considerable curiosity as well as interest. Amongst disappointments must be mentioned the new Hutton chassis, which was to have been shown, but was unfortunately not ready in time. Some of the new Hutton engines, however, are on view, and these are exciting no little admiration owing to their ingenious and neat design.

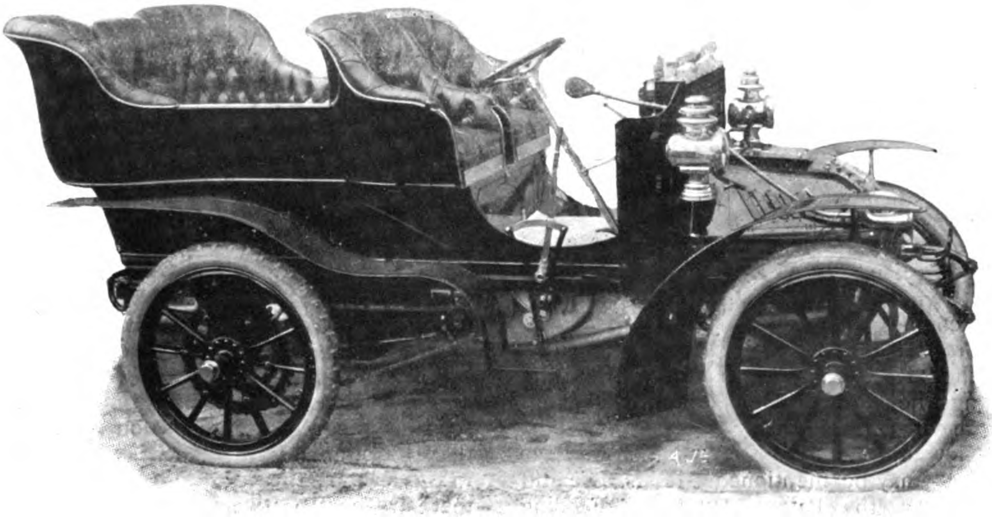
The constructional tendencies noticeable on the private and touring vehicles are for the most part similar to those seen at the recent Paris salon, but it would appear that almost greater originality is displayed by the makers in this country than by those on the Continent, although there are comparatively few instances in which radical departures have been made from accepted and well tried practice, and we are glad to say that there is almost a complete absence of what may be termed the "freak."



The Wilson and Pilcher 6-cylinder Petrol Car.

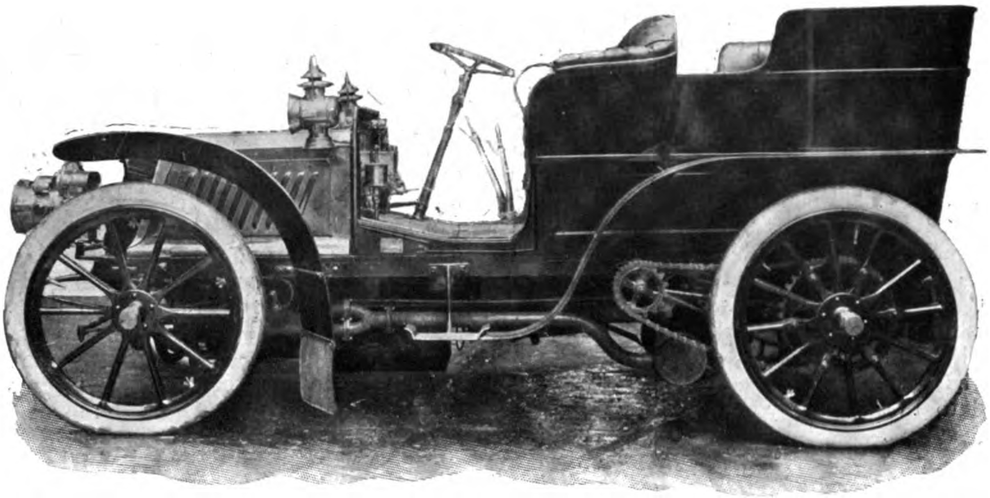
Careful examination shows that really marked strides continue to be made in the direction of simplicity and accessibility of the parts, although it is true that, in certain respects, even the best designed cars convey the impression, at the first glance, of being more complicated than they were formerly. This, however, is due to the fact that practical experience has shown the wisdom of guarding against possible breakdown to the very greatest possible extent, and that it is decidedly worth while to fit alternative mechanisms for those vital portions which are liable to give trouble on the road. Exception is often taken to the existence of any multiplication of parts, and their mere presence is considered by some to be an unwarrantable complication, but, when it is remembered that complication is chiefly objectionable because of the increased liability of breakdown occurring through it, it would be absurd to classify such extra parts as tend to obviate complete breakdown in the same category as those which, by breaking down, would render the vehicle temporarily useless. It may almost be said that there are two kinds of non-essential, though justifiable, parts, which are liable to be mistaken as evidence of ill-advised design, the one kind being those which are purely of an alternative nature, and upon whose proper operations the mechanism does not necessarily depend, and the other kind being those whose presence improves the running of the car, although, again, their failure would only have the effect of preventing the car from continuing to run better than it would without them. It may be argued that in neither case are they normally necessary, but it is only too frequently forgotten, on the other hand, that, apart from the question of additional prime cost, and comparatively insignificant additional weight, they practically do not handicap the car or add to its liability to break down. Alternative ignition systems come under the first heading, and such devices as variable lift inlet-valves or variable cut-off valves are instances of the second kind of mechanism, whilst mechanically-operated inlet-valves are of that type of "complication" which certainly do add to the number of moving parts, but they materially reduce the risk of break-down, besides adding to the good running of the car. Real complications are, as we have already said, noticeably reduced since last year, and, taking them all round, the best makers, whether British or Continental, have very considerably improved the design of their vehicles by reducing the number of parts in each portion of the mechanism, by reducing the amount of wear which takes place, by reducing noise, and by arranging the wires and pipe connections in such a way that all detachable parts of the machinery are easily removed, though they are less liable to require removal.

So various are the different forms of frame that it is practically impossible to say more than that pressed steel frames, being "fashionable," are very largely in evidence, and that they are very frequently rendered more rigid by having underframes for supporting the engine, and in many cases the gear-box also. The underframe, however, is not infrequently discarded, because it enables a larger flywheel to be employed, and because it ceases to be of so much use for supporting the engine if the main frame itself is narrowed in front of the dashboard to allow for a fuller lock of the steering wheels.



A 12-h.p. Standard Brooke Car.

The greater convenience of those bodies which have a side entrance to the rear seats is causing many of the makers to elongate the chassis, and consequently still further to increase the already long wheel-base. Such bodies as these form a very interesting feature of the Show, and a great many of the different characteristic types will be noticed in the illustrations which accompany this, and will be given with other articles dealing with the Show. Some of them are ingeniously arranged so that, although a side entrance is provided, yet it is unnecessary to increase the length of the frame, one such car being shown by the Ariel Company, in which the side door slides forward outside the front seat. A comparatively few special makes of chassis, notably the James and Browne, enable the bonnet to be dispensed with entirely, and yet allow the engine to be got at without any difficulty. In such cases considerably more latitude is given to the designer of the body, and the provision of side entrances to the rear seats is quite a simple matter. Then, too, there are quite a large number of landaulettes on view, a few of which might

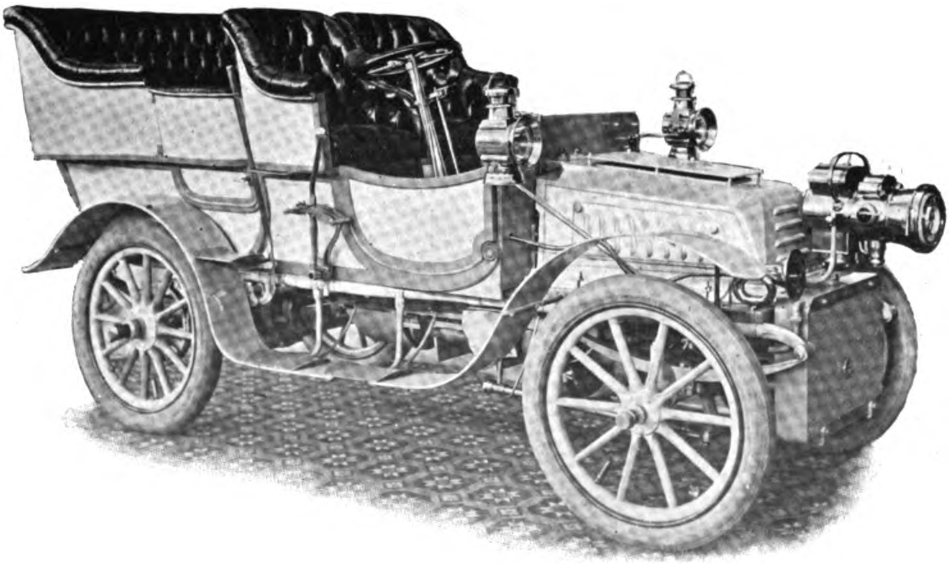


An 18-h.p. 1904 type Brush Petrol Car.

even be mistaken for electric vehicles. In most of them the main frame is considerably lowered, and a really neat carriage of this type has at last made a very general appearance. Before leaving this brief reference to the body question, it is only fair to British carriage makers to point out that they have made wonderful progress during the past twelve months in the manufacture of motor car bodies, and that it is not any longer necessary to go abroad to ensure artistic design, graceful lines, up-to-date construction, and first-rate finish.

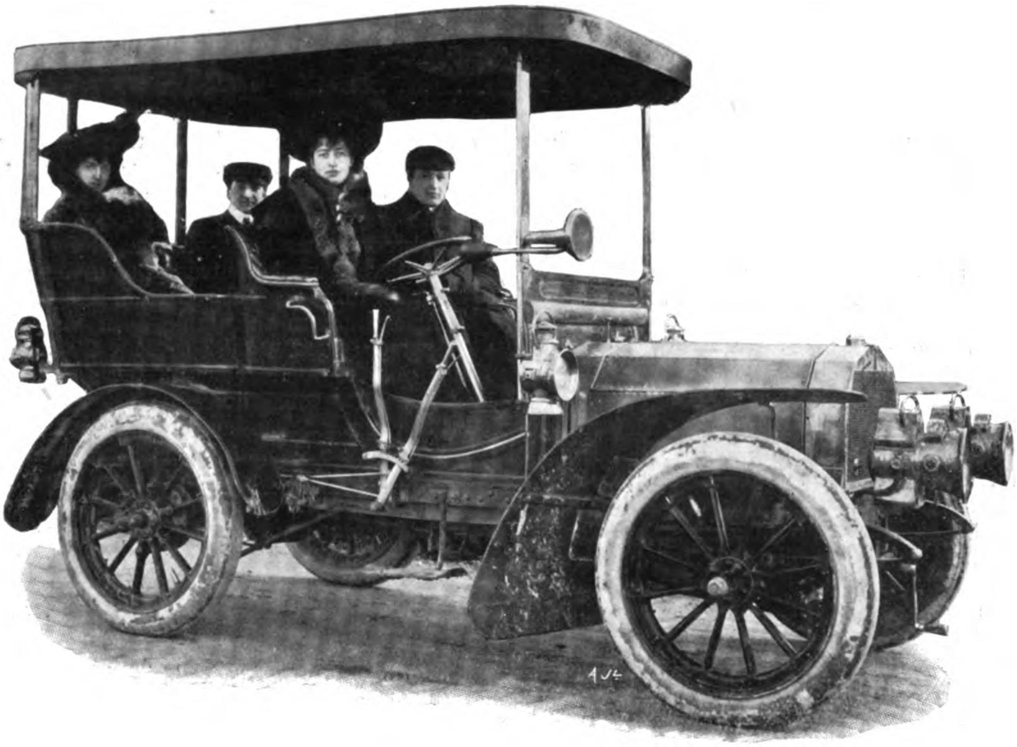
The suspension of the main frame above the axles is almost invariably effected on semi-elliptic side-springs, which are, for the most part, longer and flatter than formerly, and are now, in a few cases—such as in the Napier and Belsize cars—attached at one or both ends to the frame by sliding guides instead of by swinging shackles. Except on the 6-cylinder Napier, which we described last week, the springs lie above the axles and the back axle is bent so that it lies on a lower level than the centre of the wheels, and thus allows the frame to be brought nearer to the ground; in the Napier, however, it will be remembered that the rear springs pass beneath a straight axle, and are clipped up to it instead of down upon it. Transverse springs are comparatively rare, though a notable exception, and one in which a novel feature has been introduced is the latest Thornycroft petrol car. The inverted transverse spring, the ends of which carry the back ends of the side-springs, being fixed centrally to the frame by a hinged joint, instead of being bolted rigidly to it. This spring is therefore able to rock about its horizontal and transverse hinge, and to thus allow free play of the side springs. In very few cases is any spring suspension introduced between the body and the frame, and therefore the two exceptions to this rule which we have noticed in the Show are worthy of mention. The one is the Electromobile Company's vehicle, which we illustrated last week, in which the seat behind the driver is carried on Cee springs, and the other is on the small Swift vehicles having Panhard type change-speed-gear, which are shown for the first time at this Exhibition.

Rather than decreasing, as foretold by many of



The latest 12-h.p. New Orleans Petrol Car.

the prophets in the past, the number of makers employing horizontal engines, instead of vertical, are rather on the increase, and appear to be fully justified in continuing to employ them. The successful running of the Wolseley cars in particular has, doubtless, done more than anything else to show that a well-made and properly-designed horizontal engine is as satisfactory as an equally well-built vertical engine, and the Wilson and Pilcher, the James and Browne, the Duryea and Lanchester cars have also done a great deal to remove the prejudice which at one time existed against them. Several other English makers are also exhibiting cars having horizontal engines, amongst which attention should be drawn to the Arrol-Johnston "Mo Car," which has established an excellent record in Scotland, and to the startlingly new Lea and Francis vehicle, which is, perhaps, the most sensational exhibit this year, and is described in another column.


A 1904 Dennis Tonneau with Canopy.

The most recent engines are very greatly improved in many minor though important respects, and are, speaking generally, of lower weight, in relationship to their output than formerly, besides being capable of running at higher speeds satisfactorily, and of also doing useful work at lower speeds. The materials employed are of decidedly better grade than formerly, and nickel steel figures a good deal in their construction, particularly for the valves and the crank-shafts. The weight of the reciprocating parts has been reduced by many of the leading makers, and the cylinder castings themselves are vastly better than they were. This is particularly noticeable on the Ariel Stall, where one of their engines is cut through to show a cross-section, and it can be seen how regular is the thickness of the metal, although the thickness has been reduced to an extent which, a comparatively short time ago, was considered inconsistant with obtaining a good casting. Their 6 cylinder engine, too, has all its six cylinders formed by a single casting, the water-jacketed heads for which are formed in pairs and bolted to it. The Crossley cylinder, cut open in the same way (and illustrated by us last week), is also on view, and is another good sample of foundry work.

The majority of engines now have mechanically-operated inlet-valves, and in many cases they are made interchangeable with the exhaust-valves. Although usually arranged parallel with the exhaust-valves, either on the same side or on the opposite side of the cylinders, yet many makers mount them immediately above the vertical cylinders, or in the portion usually occupied by atmospheric inlet-valves, and are thus enabled to actuate them from the same cam-shaft as the exhaust-valves. In the new Daimler engines, the valves are all arranged alongside one another, and are mounted at an angle to the cylinders, the spindles projecting downwardly and outwardly, and being operated through small rocking levers from a single cam-shaft; the rock-shafts and the cam-shaft are hollow, so that oil is led through them to the moving parts from the crank-chamber. Then, too, in other instances, of which the Maudslay is a good example, the exhaust-valves and the inlets are all fitted into the heads above the cylinders, and the cam-shaft is mounted near them instead of in the crank-chamber. In the Belsize engines, the valves are arranged more or less in this way, but the inlets are operated from one cam-shaft, and the exhaust-valves from another, these shafts being on either side (inside) of the crank-chamber. Numerous ingenious devices are resorted to for rendering the valves easy of access, and for this purpose they are in several of the engines shown fitted in such a way that their seats can be removed with them; the new Ryknield car, the James and Browne latest model, the Maudslay vehicles, and that built by Lea and Francis, are instances in point, and it may be noted that the exhaust-valves on the

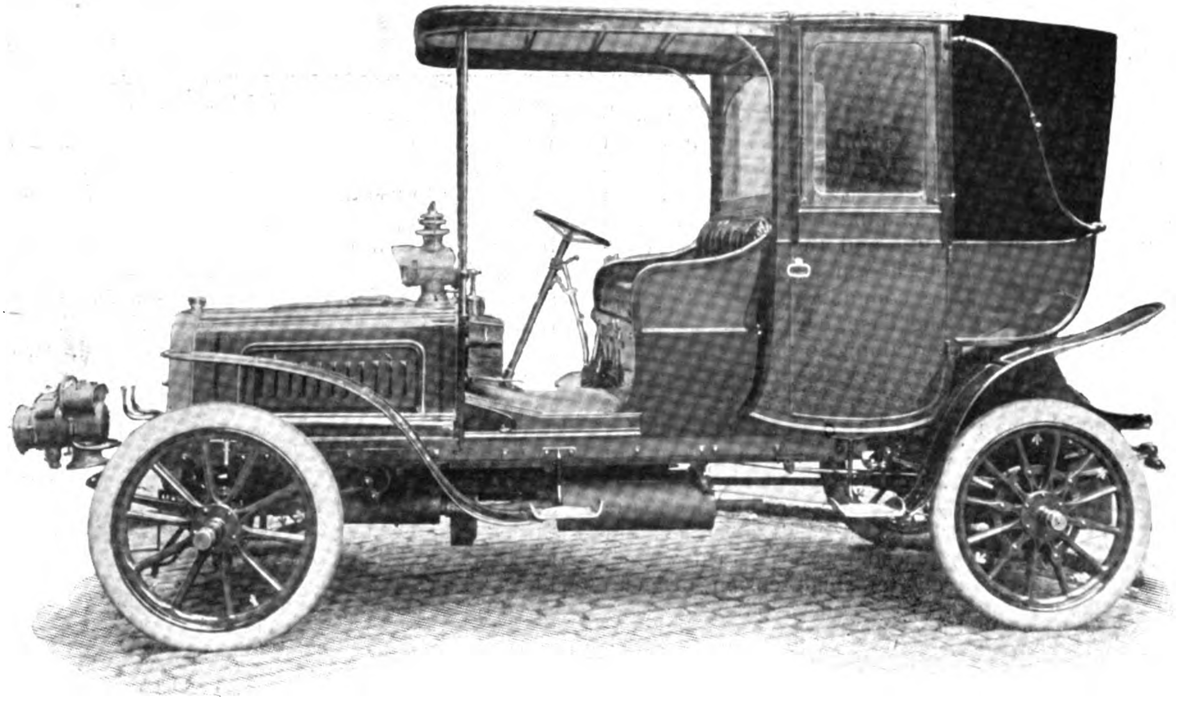
James and Browne engine are also rendered extremely easy to remove, although they are placed on the underside of the horizontal cylinders.

Quite a large number of the mechanically-operated inlet-valves are this year fitted so that a variable lift can be given to them, and the necessary mechanism for effecting this, although taking very various forms, is comparatively simple, and involves but little extra wear and tear. This introduction of variable lift inlet-valves was, to a great extent, brought about owing to the lack of any good automatic carburettor, and the usefulness of a variable lift inlet-valve for enabling a more constant degree of richness of mixture to be maintained, under varying working conditions, doubtless played its part in hastening the general adoption of mechanical inlet-valves. Now, however, that satisfactory automatic carburettors are available, the usefulness of the variable lift mechanism—or for that matter the variable cut-off valve, such as the Crossley, which gives an equivalent effect—is by no means so marked. But the mechanically-operated valves are, nevertheless, being retained owing to the direct advantages which they have shown themselves to possess in practice.

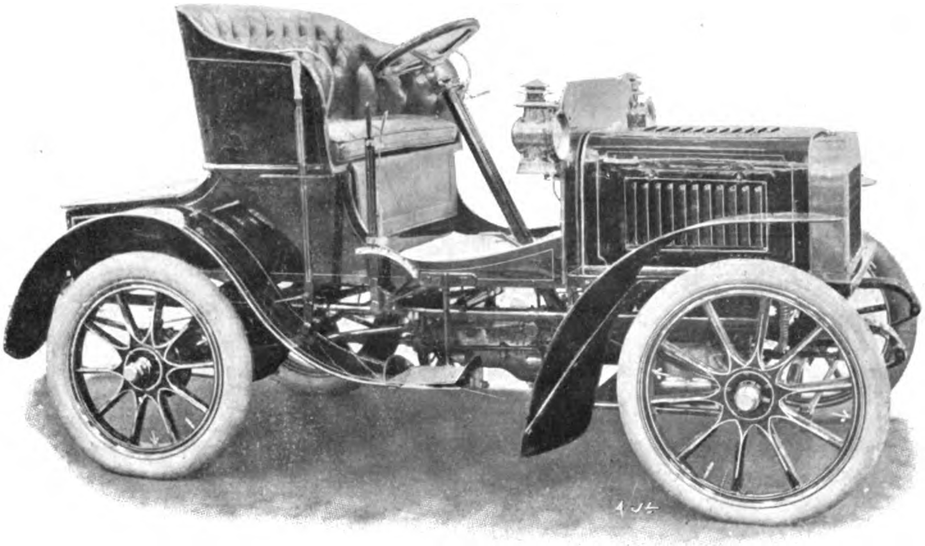
Most of the automatic carburettors now in use have already been described in our columns, and those on view in the Exhibition form an interesting subject for study in themselves. The majority of them are sufficiently effective in maintaining an approximately constant richness of mixture to enable the engine to run over a very wide range of speed, and at very varying loads, without requiring hand adjustment of any kind. But for those studying this question it should be pointed out that there is probably room for still further improvement in this direction, because the tendency for the richness of the mixture to increase depends upon at least three influences causing the proportionate flow of petrol through the jet to vary, and very few present day carburettors provide the necessary compensation for all three of these; the influences referred to are the degree of vacuum produced in the mixing chamber, the injection action of the air upon the jet, and the momentum of the petrol itself when passing through the jet. The carburettor on the Crossley car, for instance, provides for the first two, and it is, so far as we are aware, only the Chenard and Walcker design which attempts to take all three into account.

The necessary warmth for preventing the refrigerating action of the evaporating petrol from interfering with the proper action of the carburettor is derived as often by drawing the main air supply from the neighbourhood of the hot exhaust pipe, as it is by forming a jacket around the mixing-chamber and passing a portion or all the cooling water through it. The tendency is, perhaps, for the latter method on the whole to be gaining in popularity, particularly now that the engines are capable of running on very low loads and at a slow speed, when the heat and energy of the exhaust gases are trifling. Several very neat exhaust pipe fittings are to be seen on some of the cars, in which provision is made in the casting itself for the air admission to the carburettor. In the latest Daimler models, a somewhat similar arrangement is provided in conjunction with the exhaust box, which is close up to the engine on the carburettor side, and has a chamber formed in it through which the main air supply is led.

Low tension magneto ignition has come into very general use, and is almost invariably fitted so that the time of ignition can be varied by the driver. A large number of firms, however, still employ a high-tension system worked from accumulators, either alone or in addition to a magneto, and it will be noticed on several of the cars that a very simplified form of commutator has been adopted, and that the use of a single coil for a multi-cylinder engine—to obtain more accurate syn-

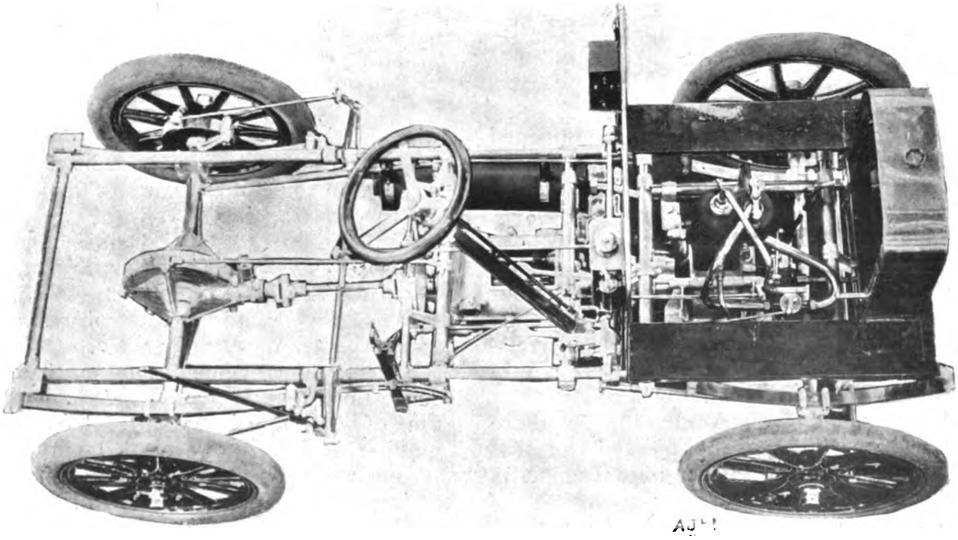


An Elswick Petrol Landaulette.



One of the new 7-h.p. Swift Light Cars which has a Panhard type of Transmission Gear.

chronism—is gradually becoming popular. The well-known Wilson and Pilcher system of this kind has been taken up by one or two firms, and the Blake method is adopted with or without modifications by others. On the new Napier cars, the commutator proper is mounted on one spindle on the dash, and the high-tension distributor on another spindle driven by gearing from the commutator spindle. The commutators are not by any means always fitted to the dash, even by those firms who have made a practice of doing so formerly, and this is largely because the forms now used are very greatly simplified and do not require very much attention. It will be noticeable at the Show that the commutator is frequently mounted on a vertical or a sloping shaft and is driven by bevel-gearing from the engine, being in this way placed in some easily accessible position inside the bonnet; on the Daimler cars the shaft is vertical, and the Ariel Company have placed the shaft in a sloping position. A comparatively few high-tension magneto systems are as yet fitted to the British cars, although we found that many of the firms were giving them a trial and anticipated using them. The advantage of being able to use them in connection with the ordinary high-tension ignition plugs, either to replace the ordinary battery and coil or to be used interchangeably with them, is such that several makers have laid themselves out to fit them to the cars made by them, if desired to do so by their customers. When a low-tension system of ignition is employed, two camshafts are usually required for operating the inlet-valves, the exhaust-valves and these igniters, but a notable exception to this is found in the new Hutton engine, in which all twelve cams for the four cylinders are fitted on one shaft, which also carries the governor at its one end; the ingenuity of the design is still further evidenced from the fact that the time of ignition is variable and that the inlet-valves have an adjustable lift.

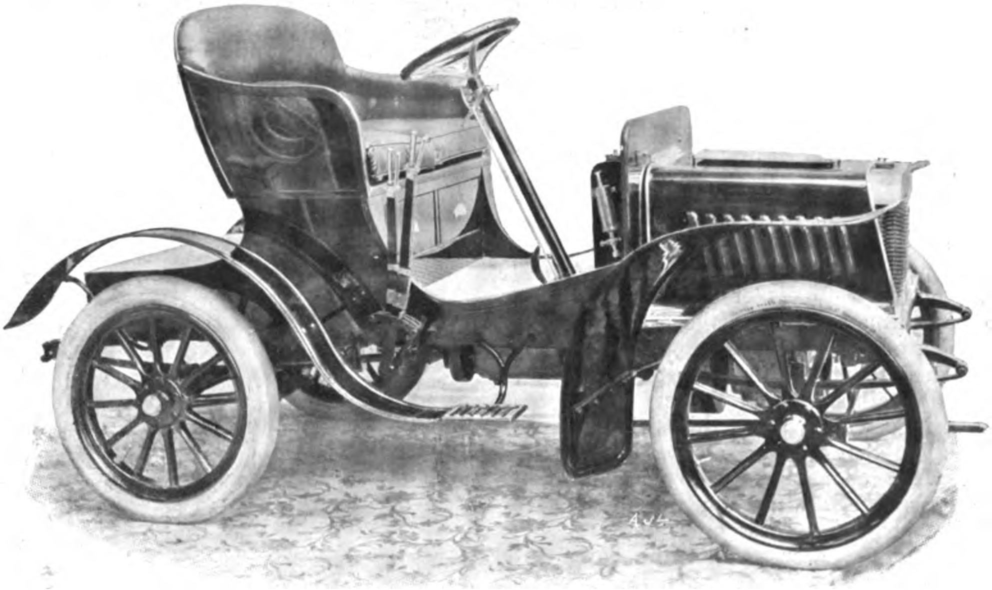


View of the 7-h.p. 1904 Swift Chassis.

The question of governing is one upon which a good deal of difference of opinion evidently exists in the minds of manufacturers, for on a few of the cars shown — notably the Wolseley — no governor at all is deemed necessary. In the majority of cases, however, a governor is provided, and it is usually connected with an accelerator lever or pedal of some kind, by which its action can either be entirely suspended or by which the strength of the spring acting against it can be varied so as to cause it to maintain any desired constant speed. Sometimes the governor is merely intended to prevent racing, and the actual engine speed is normally controlled by hand.

A good deal of ingenuity is evidenced on various cars in the Show in the means adopted to enable the small hand-levers, regulating the engine, to be placed in a convenient position above the steering-wheel. Several of these are already well known to our readers, but one or two new arrangements are to be seen on some of the stalls. On the Thornycroft car, the levers are mounted eccentrically and are almost entirely closed in by an aluminium casing, the cover of which forms a notched quadrant on its underside for them. The levers are, therefore, pressed down instead of lifted up to disengage them from the quadrant, an action which is more naturally performed, and is, therefore, more convenient. The Ariel device follows somewhat on the same lines as the Panhard, except that the horizontal rods which, when turned about their axis give the necessary control, are fitted with small arms projecting at right angles from them, instead of with small wheels answering the same purpose; this arrangement, perhaps, is not quite as neat, but it has the advantage of showing at a glance the position in which the controller has been left. Usually the rods, sleeves or wires which connect the levers with the part which they control on the engine, pass down through the hollow steering pillar, but on the Ryknield car the levers project up through the spokes of the steering wheel, and are connected with cam-shaped sleeves outside the pillar, so that the cam faces operate sliding rods passing down outside it. The levers generally vary the time of ignition and act in conjunction with the governor on the throttle-valve respectively, though, when variable lift inlet-valves are employed, this mechanism is controlled by one of the levers, and the time of ignition is then regulated from the dashboard.

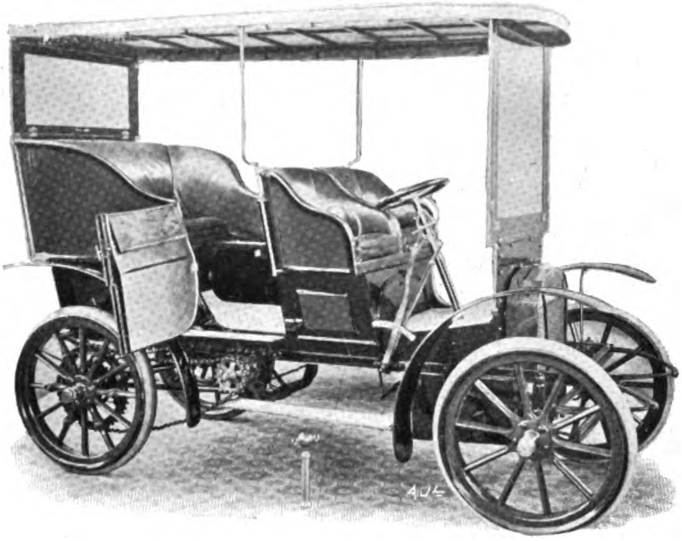
Honeycomb radiators of one form or another, and those resembling them in outward shape but built up of finned tubes, are for the most part fitted to the petrol cars. They are generally fixed at a sufficient height to ensure natural circulation taking place in the event of the pump failing to work, and a centrifugal type of pump is the most usual form adopted. Natural circulation is alone relied upon by one or two makers for keeping the water in motion, but this is not the general practice, although it appears to be thoroughly satisfactory on the cars referred to. The pumps this year are almost invariably driven by gearing from the engine, though there are a few well-known makers who still retain the friction drive from the flywheel.



The new Allday Light Petrol Car, fitted with a two-seated body.

In the way of clutches, several makers have taken up those of an expanding type, having metal-to-metal friction surfaces, as on the Crossley car. The Napier clutch also has metal-to-metal faces, but is of the cone type, and is controlled by four easily adjustable springs in such a way as to relieve the shafts of end thrust. The 20-h.p. Thornycroft chassis has one of the Hele-Shaw (Weston type) disc clutches, and these makers are showing the various parts of a similar clutch separately. The Ryknield clutch consists of a double-faced cone, forming the inner member, arranged between two outer female cones, which are normally held together against the inner member by springs, and are separated by the action of the foot-pedal. The clutch is thus entirely distinct from the flywheel, and its construction is such that no end thrusts are imposed upon the shafts. A new form of clutch, to which we referred last week, is also shown by the New Orleans Company on their latest 12-h.p. car.

The tendency to fit some form or other of flexible coupling between the clutch and the change-speed-gear is very marked, whether the cars are of the "chain-driven" or "live-axle" type, and in some cases it is to be noticed

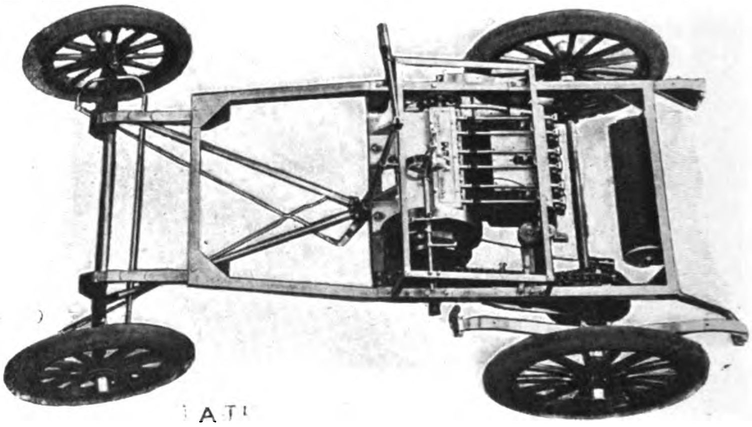


A James and Browne Bonnetless Double Phaeton, with Canopy.

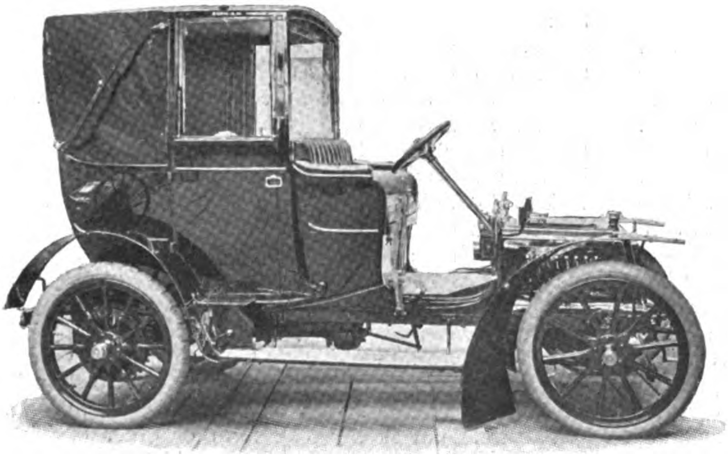
that quite a long shaft is used between these two parts. The change-speed-gear most in evidence is of the sliding-spur-wheel form, and is very generally arranged to give a direct-through-drive on the top-gear. Curiously enough, one or two makers, who have previously designed their gear-boxes so that the lay-shaft should remain idle (and at rest) when the top-gear is in use, now allow this shaft to revolve, contending that the sudden re-starting of this shaft, when changing to a lower gear, damages the gear-wheels, whilst on the other hand it is very evident that most other makers are now arranging the gear so that the lay-shaft shall come to rest when not actually in use.

Amongst interesting change-speed-gears of a more or less novel form those employed on the Langdon-Davies, the Albion, and the Hitchon-Weller cars are noteworthy; the first-mentioned because the gear-wheels are at all times in mesh with one another, and their jaw-clutches are partly controlled by the main-clutch pedal; the Albion because the differential-gear is mounted on the longitudinal gear-shaft instead of on the transverse countershaft, and also because of the ingenious construction of the gear itself; and the last-mentioned because free-wheel clutches are introduced into the spur-wheels on the lay-shaft. Then, too, there is the Albany gear, and the very unusual change-speed mechanism on the Lea and Francis chassis, both of which are described in another column.

Change-speed gears of the epicyclic type are employed on the Wilson and Pilcher, the Duryea, the Eagle, and the Dougill vehicles, to say nothing of the American Oldsmobile and Cadillac cars. The Wilson and Pilcher gear is now controlled by a single lever which is so arranged that a positive pull is exerted by it on each of the clutches, and there is no "running through" so far as the intermediate gears are concerned.

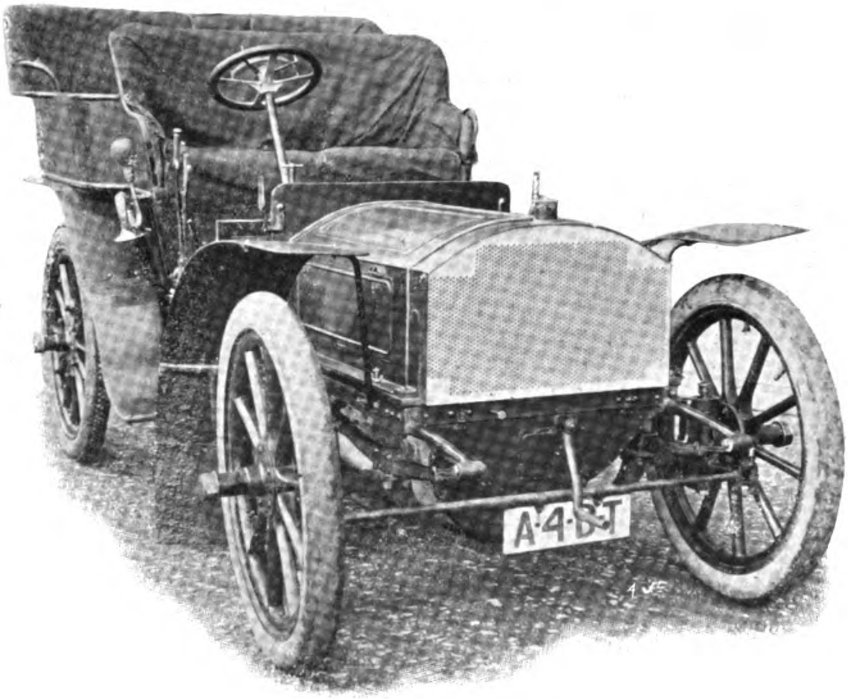


View of the new British-built Duryea Chassis from above.



3-cylinder Panhard Landaulette, exhibited by J. E. Hutton, Limited.

Side-chains and bevel-driven live-rear-axles are both as much in favour as ever with their respective advocates, and both may be said to have proved thoroughly satisfactory and reliable in practice. Single-chains passing to live-rear-axles are also being employed by a few well-known makers, particularly for their light "popular-type" voiturettes; examples are the Wolseley light car, the Duryea, and the Belsize Junior, in the last of which the chain is enclosed. The 1904 Dennis cars have a form of worm-gearing instead of bevels for connecting the propeller shaft with the live-axle. Except on the Marston cars the side-chains are exposed. In connection with "live-axle" cars, an interesting departure has been made on the new Thornycroft cars, the engine and gear being fixed at an angle so that the entire direct-through-shaft is practically straight. Metal-to-metal brakes, many of



The 18-h.p. 1904 Standard Germain Car.

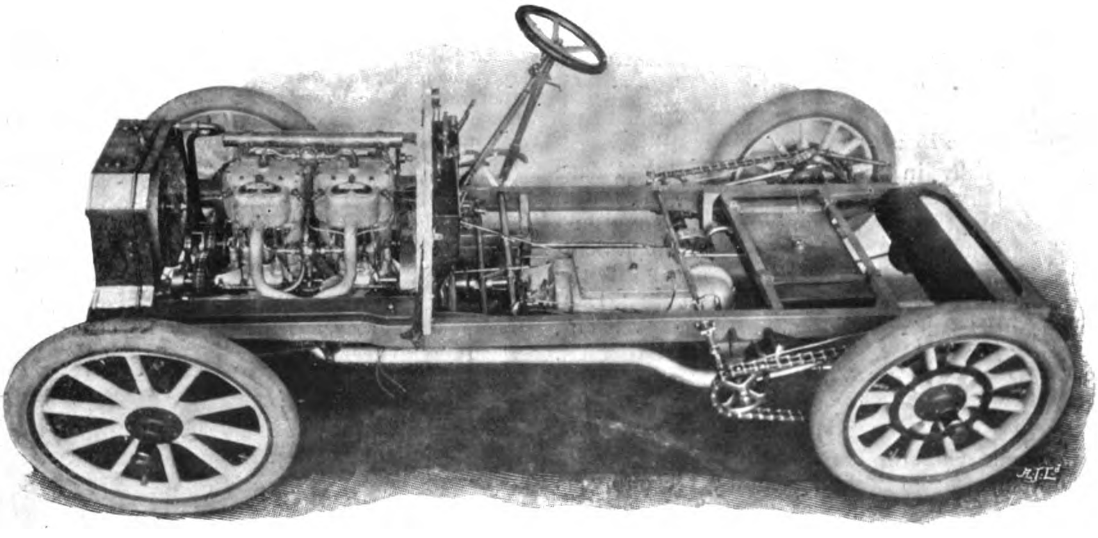
them of the expanding type, are very much more in evidence than they were last year, and have in fact been adopted by most makers. It is very noticeable, too, that some form of ratchet-and-pawl device is now being fitted on many of the cars to replace the ordinary sprag.

Apart from the very complete exhibits of the leading British heavy steam lurries and tractors in their special section, comparatively few makes of steam cars are represented, these being the White, the Serpollet, and the Miesse. The remarkably sudden disappearance of the Locomobile type of light steam runabout is particularly brought home to those who have been accustomed to see it figure so conspicuously at former shows. A new British steam vehicle—the "Keenelet"—is on view for the first time.

Of electric vehicles, an imposing display is made by the Electromobile Company with their well-known cars, and other vehicles are exhibited by the London Electromobile Company and the Anglo-American Company.

Large petrol 'buses and wagons are shown by the Milnes Daimler Company, and a lurry, fitted with one of their petrol engines, by the Thornycroft Company.

Light petrol vehicles of English manufacture are the Wolseley, Achilles, Swift (with Panhard-type gear), Alldays (new model), and Vauxhall, whilst cars are shown which are made by the Horley Motor Company and the



View of the 30-h.p. Pritchetts and Gold Petrol Chassis.

General Motor Car Company to sell at unusually low prices. The makers of heavy steam vehicles who are represented include the Thornycroft Company, the Coulthard Company, the Straker Company, the Ellis Company, the Foden Company, Hindley and Sons, Tasker and Sons, Wallis and Steevens, and the Bristol Wagon Company.

Most of the well-known Continental manufacturers of petrol vehicles are well represented by their English agents. The majority of their new 1904 cars have already been dealt with by us, and were on view at the recent Paris Salon. The Panhard Company, as usual, have an attractive stall; one of the new 18-28-h.p. Mercedes vehicles (described in another column) is shown by the Cannstatt Automobile Association; Bollée cars are to be seen on the Speedwell Motor Engineering Company's stand; Chenard and Walcker models are exhibited by the Weston Motor Syndicate, Clements by Mr. E. H. Lancaster, and Renaults and Mors by the Roadway Autocar Company. Mr. C. O. Selbach has a fine exhibit; the De Dion Company are well represented; the Fiat Motor Company have a new model since the Paris Salon; Hewetsons show the new Benz types; the Motor Car Company display Decauville cars, including an 8-h.p. petrol tram; and the Gobron Motor Company have one of the last 25-h.p. chassis on view.

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A Cadillac Delivery Van, shown by the Anglo-American Motor Car Company.

The Inaugural Luncheon.

By way of formally inaugurating the Crystal Palace Show an official luncheon was given on Saturday last in the large restaurant, when a number of distinguished guests took part in the proceedings. The Hon. J. Scott Montagu, M.P., presided, and he was supported by the Postmaster-General (Lord Stanley), Lord Hothfield, Lord Norbury, Lord Claud Hamilton, Sir Edgar Vincent, M.P., Colonel Saunderson, M.P., Mr. George Montagu, M.P., Sir John Macdonald, Earl Russell, Mr. C. Stuart-Wortley, M.P., Mr. Henry Norman, M.P., Sir John Thornycroft, Earl De La Warr, Major-Gen. Sir Charles Knox, Sir Bache Cunard, Hon. Arthur Stanley, M.P., and many others. Lord Balfour sent by telegram his regrets at his enforced absence, whilst at the same time wishing automobilism and the Society every success.

The loyal toasts having been disposed of by the chairman, the important duty of proposing "The Automobile Industry" was placed in the hands of Lord Stanley.

No words of his, Lord Stanley said, could so amply put the toast before them as their own eyes had been able to do in viewing the great show which had been opened there within the last twenty-four hours—certainly the greatest show ever held in this country, or, he believed, in other countries also. They were only as yet on the fringe of the development and utility of motor traction in this country. As yet the public were only beginning to see the utility of motor traction. A short time ago, at the War Office, he was chairman of a committee which, for the first time in that office, was created to see if they could not introduce motor traction into the Army. He believed it was certain that in the future they would be able in the Army to depend for much of their transport work on motors. They had seen the beginning of a corps which had proved of great usefulness, viz., the Motor Volunteer Corps. Incidentally, he might repeat a story which he had heard since the manœuvres. It was told by a General Officer who was an umpire, and was in a car which might be described as an 18-h.p. When he got to a particular point, he said to the gentleman who was driving it, "I want to stop here." "Stop!" said the driver, "do you think I am going to stop and be passed by a 10-h.p.?" The result was that the General enjoyed a very pleasant ride, but umpiring for that day was out of the question. But what about the future of automobilism in this country? He could hardly speak of that without alluding to the past. As they knew, a Bill was introduced into the House of Commons last year to deal with automobile locomotion. It emerged a very different Bill from what it went in as, and a great deal of abuse had been hurled at two friends of his—the chairman and Mr. Henry Norman—for the part they took in what was called "allowing the House of Commons to whittle the Bill down." He must be allowed to say this, that if it had not been for the tact and skill of those two gentlemen we should not have had even so good a Bill as we had at the present moment. It was those two gentlemen alone who, by their tact, their energy, and their power of conciliation were able to bring out a Bill which, with all its faults, had proved, he thought, of some advantage to automobilists.

There was no doubt that whatever good nineteen motor car drivers out of twenty did by driving with the safety of the public in their minds, and endeavouring as far as possible to meet the views of those who were opposed to motor locomotion, was more than discounted by the twentieth man, whom they knew to be a rough. The future was in their own hands. The Act was a temporary one, and would have to be dealt with in three years' time, and in the spirit that was meanwhile infused into the movement; therefore it behoved them to do all that was possible to organise themselves into being themselves the restrictors of those who broke the law.

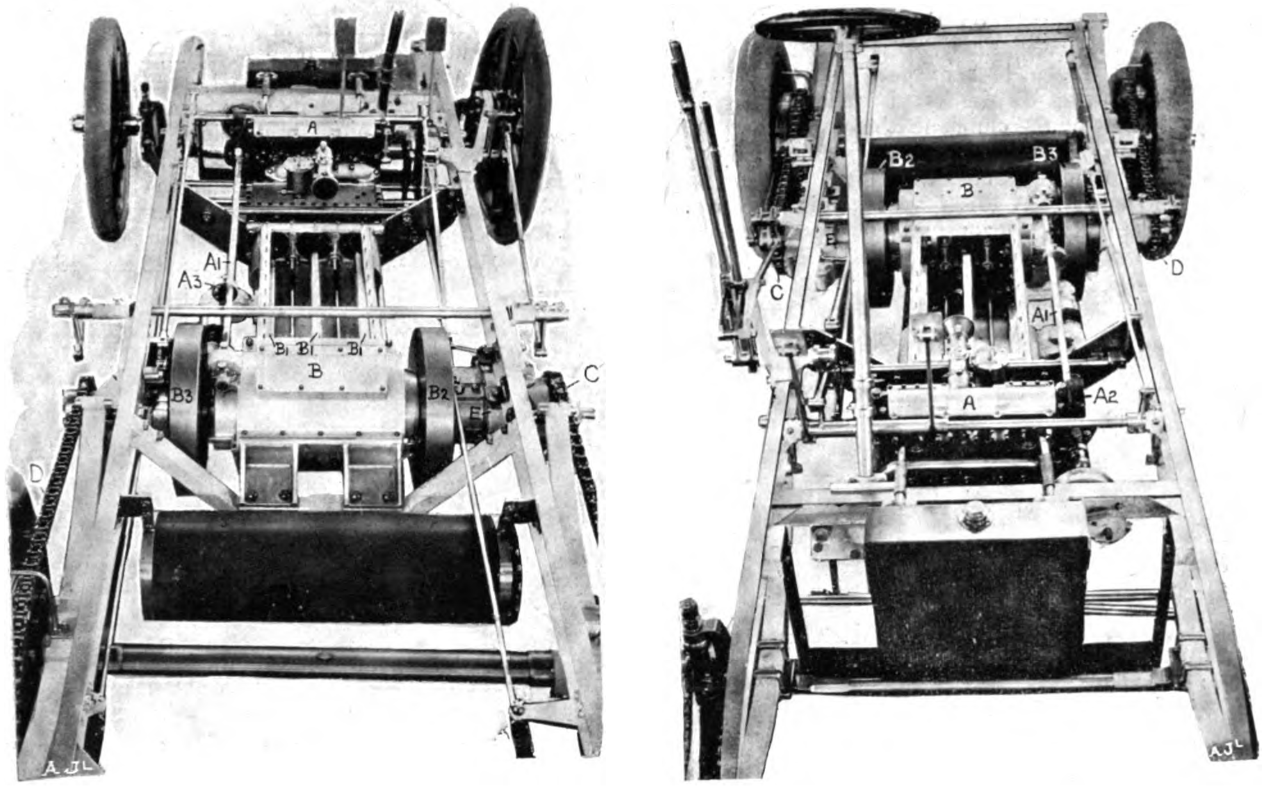
A Comparison.

He did not know whether he could allude to another sport, but personally he happened to be on one of its ruling bodies. He referred to the sport of racing. The rulers of racing at the present time were the Jockey Club, a self-elected body, very, very small in proportion to the number whom it governed, and yet its decisions were received without comment, and were always assented to by the large mass of the race-going public. Why was that? It was because they had been able to establish themselves as a body who, racing themselves, endeavoured to keep the sport on the highest possible plane, and were ready to listen to all sides, and who were not ready to be blown hither and thither by the breath of public opinion. They had got to form a committee which should manage all this business, and which should have the respect not only of motorists but that of the public at large also. He wished to say nothing against a club to which he himself belonged—the Automobile Club—but he doubted whether at the present moment it inspired in the country the same respect with regard to motors that the Jockey Club did with regard to races. He believed it was possible, however, within the Automobile Club to form such a body of men as would inspire respect, and he would hope and trust that when the Bill came before the House again it would come with the assent of that body, and with the advice of the members of that body, which should carry with it not only the general assent of motorists but of the greater public outside. If that could be done, then the future of automobilism would be smooth sailing.

Mr. Frederick R. Simms, President of the Society of Motor Manufacturers, and Mr. Charles Jarrott responded.

The toast of "The Visitors" was proposed by Mr. E. Schenck, the General Manager of the Crystal Palace, Sir John Macdonald replying in a humorous speech.

THE LEA AND FRANCIS PETROL CAR.



Two views of the Lea and Francis Petrol Chassis from above, showing the general arrangement of the Engine and the Transmission Gear.

THE new chassis manufactured and shown by the well-known cycle firm, Messrs. Lea and Francis, of Coventry, is constructed throughout on extremely novel lines. Two views of the chassis, which is now on view at the Crystal Palace and is, naturally, attracting a great deal of attention and comment on their stall, are seen in the accompanying illustrations. These views are reproduced from photographs taken from above, the first from the rear, and the second from in front.

The rectangular main frame is constructed of rolled steel members, which have an H cross-section, and is very strong. The engine has three horizontal cylinders formed by a single casting, and they lie just behind the steering-pillar beneath the level of the frame. The peculiarity of the engine is that the crank-chamber, B, is quite a long way off the cylinders, and that an intermediate aluminium casting, having a large detachable cover, is introduced between the cylinders and this chamber. The connecting rods, B^1, are therefore extremely long, and the advantage claimed for this construction is that the angle through which they have to move about the gudgeon pins in the pistons is very considerably reduced. These connecting rods, B^1, are made of rolled steel, and have an H cross-section. The three crank-pins are set at an angle of 120 degrees from one another, as usual, and each end of the crank-shaft outside the chamber, B, carries a flywheel (B^2 and B^3) which forms the external member of a cone clutch.

The inlet and exhaust valves for each cylinder are arranged on the upper side of the casting, and their spindles are vertical; they are all operated from cams mounted on a cam-shaft, which is arranged inside a neat casing, A, in very much the same way that they are on the Maudslay engine. The cam-shaft, however, is driven by spiral gear-wheels from a longitudinal shaft, A^1, which passes rearwardly from the crank-shaft, and is driven by gearing from it. The spiral gear-wheels referred to are enclosed in a casing, A^2, which is free to rock about the shaft, A^1, and is rigid with the casing, A. The whole casing, A, together with the cam-shaft, can therefore be hinged up out of the way when it is necessary to get at any of the valves, and the casing is normally held down in place by a couple of swinging studs at the end furthest from the shaft, A^1.

A centrifugal governor is mounted on the front end of the shaft, A^1, and the commutator and the circulating pump are also driven from that shaft.

The transmission gear provides three forward speeds and a reverse in such a way that the second and third speeds ahead are obtained through direct drives and a single chain to the live-rear-axle. It will be noticed that the crank-shaft occupies very much the same position as the differential countershaft in an ordinary chain-driven car, and that the chains, C and D, pass from the ends of shafts, which are in line with it, back to the rear axle. It should, however, be pointed out that the power is only transmitted through one of these chains at a time and that the differential-gear is mounted on the back axle. Both the large chain-wheels on the axle are rigid with the shell of the differential so that there is a sleeve connecting the two together, and this sleeve lies between the live portion of the axle and the external stationary tube. The chain-wheels over which the chain, C, runs, are of more nearly the same size than are those over which runs the chain, D, so that when the shaft carrying the sprocket on the right side is rendered rigid with the crank-shaft, by a clutch mounted on the fly-wheel, B^2, a higher speed is obtained than when the sprocket on the left is rendered rigid with the crank-shaft by the clutch in the wheel, B^3. Allowing the clutch, B^2, to come into engagement, therefore, gives the top speed, whilst the clutch, B^3, introduces the second speed. A lower speed and a reverse, for use on exceptional occasions, are contained in a casing, E, which lies alongside the clutch, B^2. This gearing is of the epicyclic type, and normally revolves as though it were solid with the two portions of the divided shaft passing through it, so that it does not impair the efficiency of the direct drive, from the clutch, B^2, to the chain, C, when the higher speeds are in use.

The cylinders have a bore of 4 in., and the stroke of the pistons is 5 in. The normal speed of the engine is 600 revs. per min., and its maximum useful speed is about 800 revs. per min. It develops about 17-h.p. on the brake. A very ingenious mechanism is fitted for operating the change-speed-mechanism from a single side-lever, and the details of construction of all parts have evidently been very carefully thought out. The weight of the car complete is between 18 and 20 cwt.

THE LANGDON DAVIES CHANGE-SPEED-GEAR.

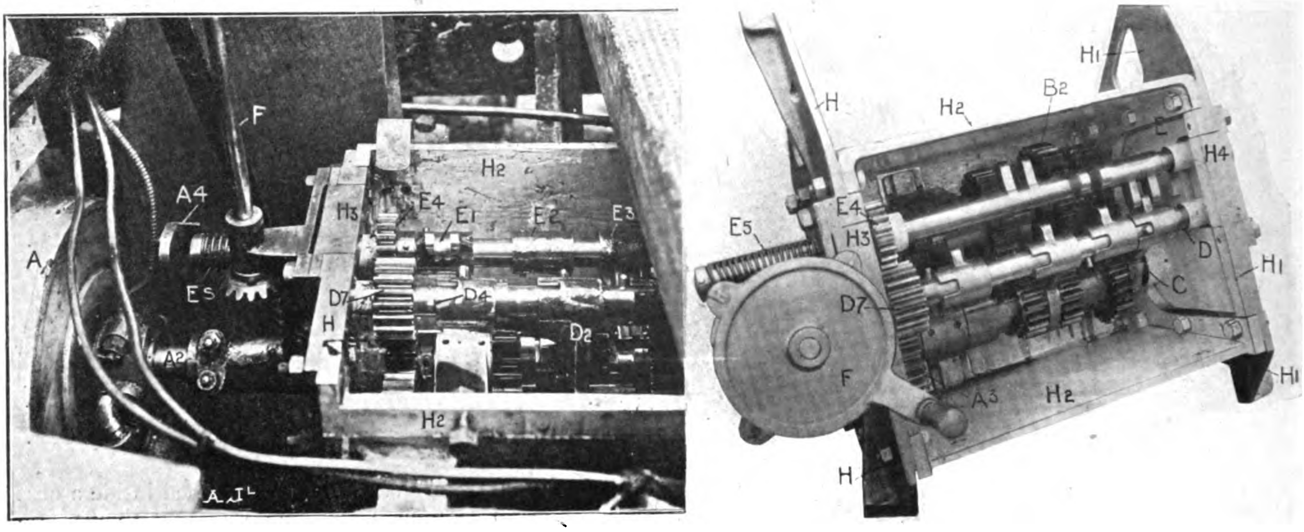


FIG. 1.—View of the Gear fitted to a Car. FIG. 2.—View of a Working Model.
Langdon Davies Change-speed-gear.

THE chief feature of the "Langdon Davies" exhibit at the Crystal Palace Show is their new change-speed-gear, which embodies several advantageous features, and is entirely different from their earlier design. Fig. 1 shows the gear actually fitted on a 12-h.p. car, while Fig. 2 is a photograph of the interior of a working model exhibited. Fig. 3 shows the arrangement of the gear in diagrammatic form, in which A represents the main-clutch which is disengaged by the foot-pedal, A^1. The clutch-shaft, A^2, terminates in the gear-box with a pinion, A^3, which is continually in mesh with the spur-wheel, B^1. This wheel, B^1, is keyed to the lay-shaft, B, on which are also keyed the two wheels, B^2 and B^3, meshing with the pinions, C^1 and C^2. These pinions when not required to transmit power run free on the shaft, C, on which are three jaw-clutches, C^3, C^4, C^5, free to slide longitudinally on the squares provided. Engaging in collars cut in the jaw-clutch sleeves are levers, D^1, D^2, D^3, mounted on a spindle, D, in such a way that motion along the spindle, D, can only take place when one of the pins, D^4, D^5, D^6, coincides with one of the slots cut in the sleeves to which the levers are joined. When this occurs that particular lever may be drawn forward, and the jaw-clutch which it operates caused to engage its neighbouring pinion by the jaws formed on it for that purpose. The motion of the jaw-clutch levers is accomplished by the sliding-rod, E, which carries the collars, E^1, E^2, E^3, fixed to it, and either of which may be made to engage with lugs on the jaw-clutch lever.

The operation of changing gears is as follows:—The main-clutch pedal is depressed, and this first releases the clutch, A, and afterwards pushes backwards the sliding rod, E, by the lever, A^4, thus disengaging from its pinion whatever jaw-clutch had previously been in action. The change-gear handle, F, is now rotated until one of the pins on the spindle, D, with which it gears, is brought into line with the notch in the sleeve of the correspond-

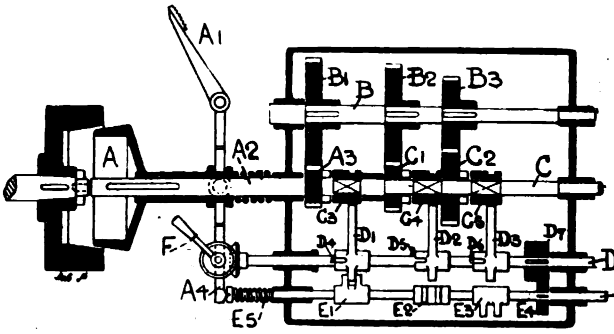


FIG. 3.—Langdon Davies Change-speed-gear.

ing lever. By means of the gear-wheels, D^7 and E^4, the sliding shaft, E, is simultaneously turned in such a way that when the pin and notch are in position on the spindle, D, the corresponding collar on E has just engaged with the lug on the jaw-clutch lever. Releasing the main-clutch pedal allows the spring, E^5, to draw out the sliding-rod, E, and engage the jaw-clutch with its pinion. In Fig. 3 the mechanism is shown in the position just prior to engaging on the highest speed; on releasing the clutch-pedal, A^1, the collar, E^1, moves to the left with the rod, E, under the action of the spring, E^5, and carries with it the lever, D^1, and the jaw-clutch, C^3, which engages with the pinion, A^3, thus giving a through drive on the top speed. It will be noticed that the change-gear handle, F, is locked by the pin, D^4, in its slot, and that it is therefore necessary to depress the clutch-pedal, A^1, before any change of gear can be effected. While A^3 and C^3 are engaged, the pins, D^5 and D^6, prevent the levers, D^2 and D^3, from moving, and consequently any possibility of one of the other trains shaking into gear by accident is entirely avoided.

To obtain a neutral position, the change-gear handle, F, is merely placed in any intermediate position between two speeds, when it is also locked, by one of the collars, E^1, E^2, or E^3. Any attempt to turn the handle, F, tends to rotate the rod, E, by reason of the meshed gear-wheels, D^7 and E^4, which is impossible while the main clutch, A, is in, as the collars, E^1, E^2, E^3, are so arranged that one of them will foul one of the lugs on the jaw-clutch levers. It is only possible to engage a collar with its proper lug when the main-clutch pedal is depressed sufficiently to bring them into the position required.

In fitting these gears to cars the main-clutch pedal is given somewhat more than the average range in order to allow the clutch to be slipped in the ordinary way without disengaging the gear, which can only be done by pressing the clutch down to its fullest extent.

Messrs. Langdon Davies are exhibiting on their stand the delivery van we illustrated last week, which is fitted with this gear, and has three speeds and a reverse; the "reverse" is obtained by an idle wheel in the gear-box. Running in the grounds is a 12-h.p. car, also fitted with this gear, which we took the opportunity of trying, and were much impressed by the ease and certainty with which the gear can be changed.

Although the present cars are arranged with the change-gear handle on the top of a vertical spindle, which projects up through the foot-board, the gear is equally adaptable to the use of a side-lever attachment instead.

In the working model, a photograph of which is shown in Fig. 2, a considerable economy of space has been effected by combining some of the pinions with some of the jaw-clutches in such a way that the addition of an extra speed adds little more than the width of a wheel to the length of the gear-box.

A point worthy of notice in the construction of the gear-box is the way in which the whole gear is carried between two bearing plates which are extended into brackets, H and H^1, bolted to the main-frame. The aluminium sheath, H^2, which retains the oil, can therefore be easily let down, leaving the whole gear exposed. The sliding rod, E, and the spindle, D, which carries the levers are mounted on separate plates, H^3 and H^4, which register into the plates carrying the gear-shafts in such a way that they may be easily removed without dismounting the rest of the gear.

THE 1904 F.I.A.T. PETROL CARS.

The new Fiat models, built by these well-known Italian makers, are very considerably improved since last year, and are excellent examples of good workmanship. The 1903 vehicles were very fully described by us on December 5th last, so that it is sufficient now to point out the new features which have since then been incorporated. They are still made in two sizes, both of which have 4-cylinder engines, and are nominally of 16 and 24-h.p. respectively. The bore and stroke of the smaller engine are still 110 by 110 mm., and this engine gives about 21-b.h.p. at normal speed. The 24-h.p. engine has a bore and stroke of 125 by 125 mm., and it is capable of developing about 36-b.h.p. A new 16-h.p. chassis, from which the accompanying illustrations have been obtained by us, arrived in this country just before the Show, and is now on view at the Crystal Palace. We understand that the 24-h.p. model is of precisely similar design throughout, so that the following description is applicable to both.

The main frame is now constructed of pressed steel instead of armoured wood, and it has no underframe, either for the engine or the gear-box. Its shape is seen in Fig. 1, where it will be noticed that it is considerably narrower in front than behind the dashboard, and that it has two intermediate cross-members. The engine, which is seen from the right-hand side in Fig. 2, is fixed direct by four feet to the side members of the frame, and the change-speed-gear is held in place by a 3-point suspension. The arrangement of the cylinders has been but little changed, except that the inspection covers screw into the castings above the valves instead of being held down by yokes. The inlet-valves and the low-tension igniters are fitted on the right side as before, and are operated by one cam-shaft, which is made hollow, and is still provided with an automatic governor by which the time of ignition is varied to suit the speed of the engine. Both the magneto and the pump are gear driven, one on each side of the engine.

The engine is fed with oil from a belt-driven lubricator on the dash, which is of the same special type as that previously described by us, but is now of even neater construction. It will be remembered that in this lubricator, small paddle-wheels distribute the oil in measured quantities to each of the feed pipes, and that a specially constructed chain feeds the oil up to the paddles from the reservoir beneath.

The new carburettor automatically ensures a comparatively constant richness of mixture by having the throttle-valve connected with the auxiliary air admission valve. These valves are connected, through the hollow exhaust cam-shaft, with the governor on its forward end, and the normal speed of the engine can be regulated by a small lever above the steering-wheel, and by an accelerator pedal.

The petrol tank is fixed beneath the main frame at the rear, and the pressure is maintained in it by the exhaust gases in the well-known manner; a hand-pump is also fitted on the dash for obtaining the necessary pressure when the engine is at rest.

The flywheel is considerably larger and heavier than formerly, so that, in conjunction with the improved carburettor, it allows the engine to run at a slower speed than formerly. The spokes of the flywheel form the necessary fan for drawing the air through the honeycomb radiator, and the engine is of course completely sheathed in on the underside. A main clutch, of the internal expanding type, having metal-to-metal friction surfaces, is now used, and the pedals, which operate it and apply the countershaft brake, are of the "push" pattern.

The change-speed gear has been entirely remodelled, and the second-motion-shaft now lies to the left of the first-motion-shaft. The transmission gear throughout is fitted with ball-bearings, as also are the road wheels. The gear-box has a very large inspection cover, and its sliding members are arranged on the Mercedes lines, the sliding wheels being mounted on two independent sleeves; the reverse intermediate gear-wheel is carried by a rocking-arm. The change-speed-lever moves forward and backwards in either of two alternative slots for the "ahead" speeds, and has a safety catch which, when withdrawn, allows it to pass into a third slot for introducing the "reverse."

The side brakes are of the internal type, and are compensated by springs, the semi-elliptic side springs are very long, the spring-horns in front form a part of the pressed steel frame, and the radius rods connecting the back axle with the frame are of the flat type which have comparatively recently come into vogue. This new Fiat model is extremely well designed, and is apparently well calculated to maintain the reputation of the makers. It has, too, a very neat appearance, besides being of thoroughly substantial construction.

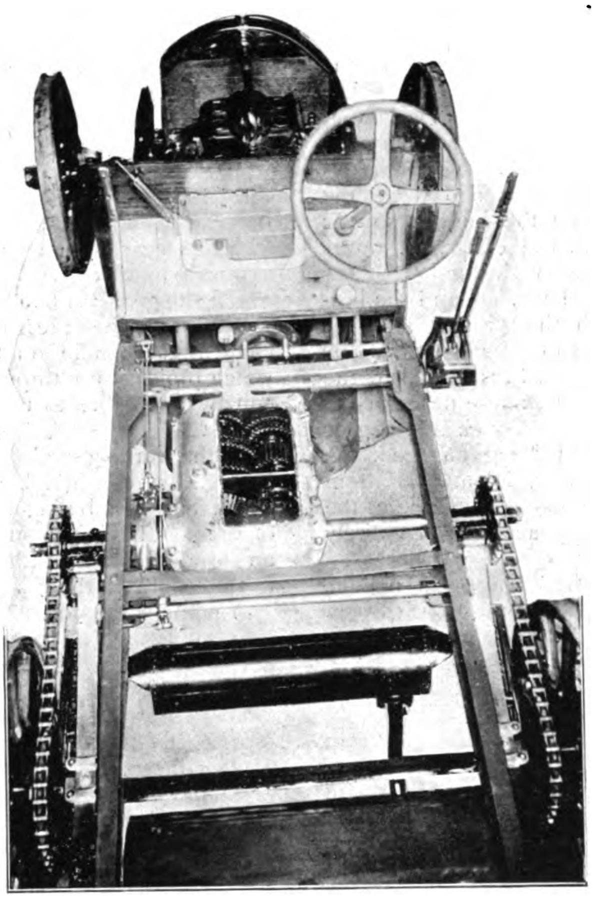


FIG. 1.—A view of the 1904 16-h.p. Fiat Chassis from above.

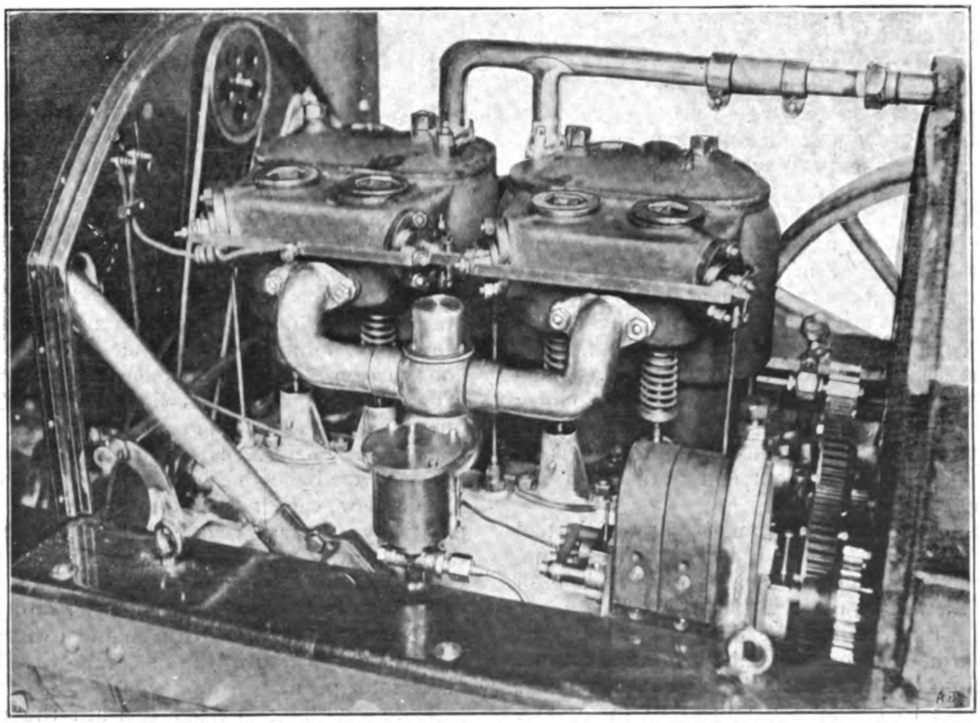


FIG. 2.—The latest 16-h.p. Fiat Engine from the right side, showing the new Carburettor and the Automatically-timed Magneto.

THE 1904 MERCEDES MODELS.

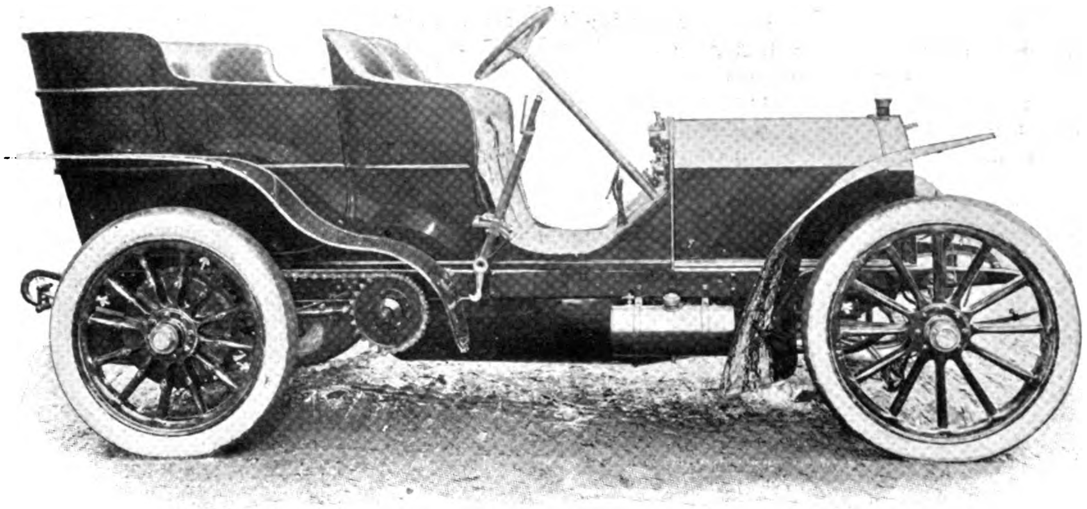


Fig. 1.—The 1904 40-h.p. Mercedes Car.

Some of the new Mercedes cars have recently arrived in this country, and we have therefore been able to obtain the accompanying illustrations of a 40-h.p. car, by the courtesy of the Milnes-Daimler Company, and of an 18–28-h.p. vehicle, from the Cannstatt Automobile Supply Association, of 34, Shaftesbury Avenue.

Comparatively little alteration has been made on the larger car, though it is no longer fitted with the mechanism for varying the lift of the inlet-valves, and a new type of carburettor is fitted. The car itself is shown in Fig. 1, the dashboard, together with the regulating levers and pedals in Fig. 2, and the engine from either side in Figs. 3 and 4. In smaller details, important improvements have also been made to further strengthen many of the parts, especially the axles, and it is certain that this year's machines are as well calculated as ever to maintain the high reputation of this Company as manufacturers of first-class motor vehicles.

A comparison of Fig. 3 with last year's model shows that on this side of the engine very little change has been made, except that the variable lift device is absent. The triple seated inlet-valves are mounted centrally above the cylinders and are operated by rocking levers and vertical rods from the same cam-shaft as the exhaust-valves.

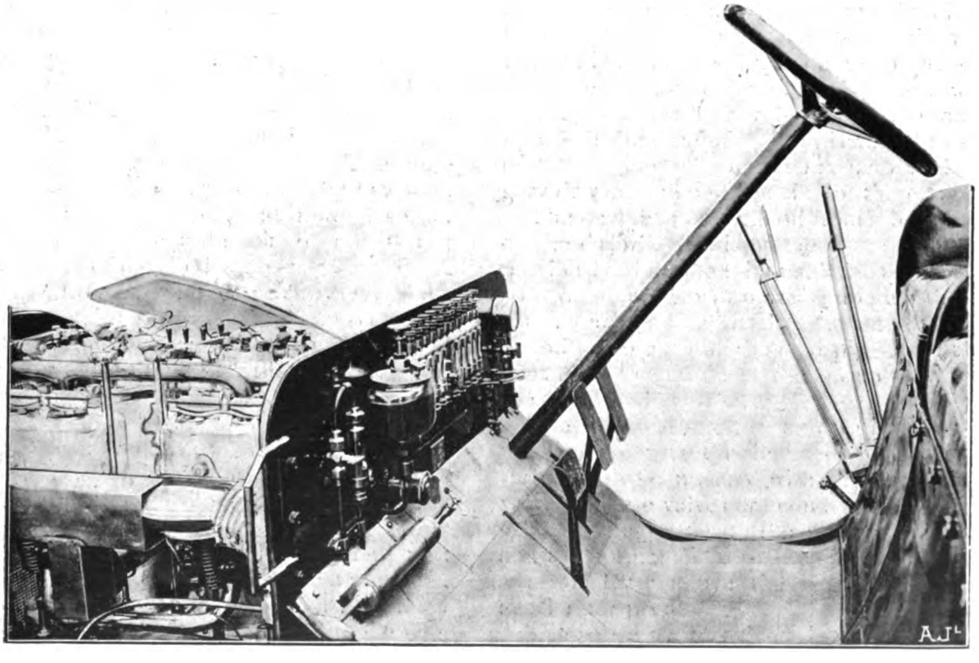


Fig. 2.—View of the Dash, together with the Regulating Levers and Pedals, on the 40-h.p. Mercedes Car.

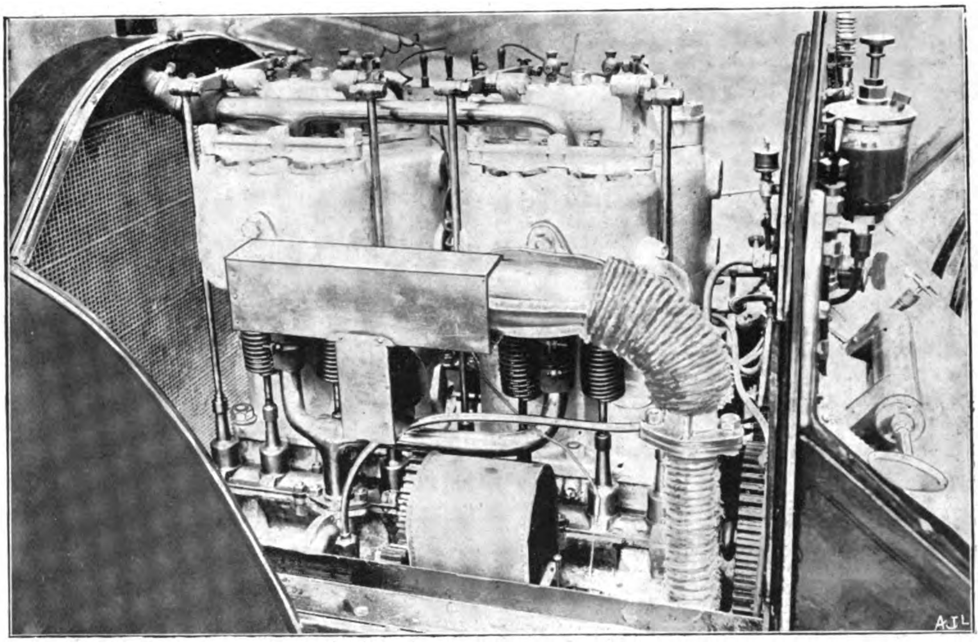


FIG. 3.—The 40-h.p. Mercedes Engine, from the Left Side.

The centrifugal pump, and the magneto too, are driven by spur gearing from the centre of the same shaft and the wheels, by which this shaft is driven from the crankshaft, are at the back end of the crank-chamber.

On the other side of the engine (Fig. 4) the new carburettor is visible, and it will be noticed that the throttle-valve is arranged in the casting that forms the mixing-chamber, the governor being connected with it. The normal speed of the engine is regulated by one of the small hand-levers above the steering-wheel, and it also acts upon the same throttle. A constant richness of mixture is maintained by constructing the throttle in such a manner that it also varies the quantity of auxiliary air which finds its way into the mixing-chamber and the induction pipe. An important feature of the new carburettor is that the effective size of the spray jet can be varied by a hand-lever on the dash. This lever is seen in Fig. 2, and lies almost immediately in front of the steering-pillar. The rod connecting it with the needle-valve is also clearly shown in Fig. 4, and the

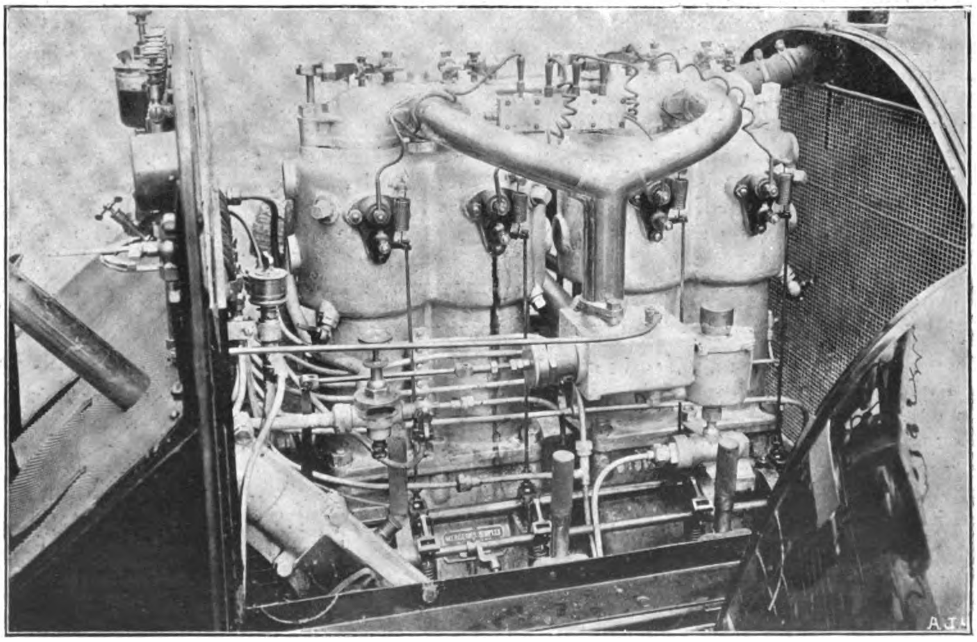


FIG. 4.—The 40-h.p. Mercedes Engine, from the Right Side, showing the new Carburettor.

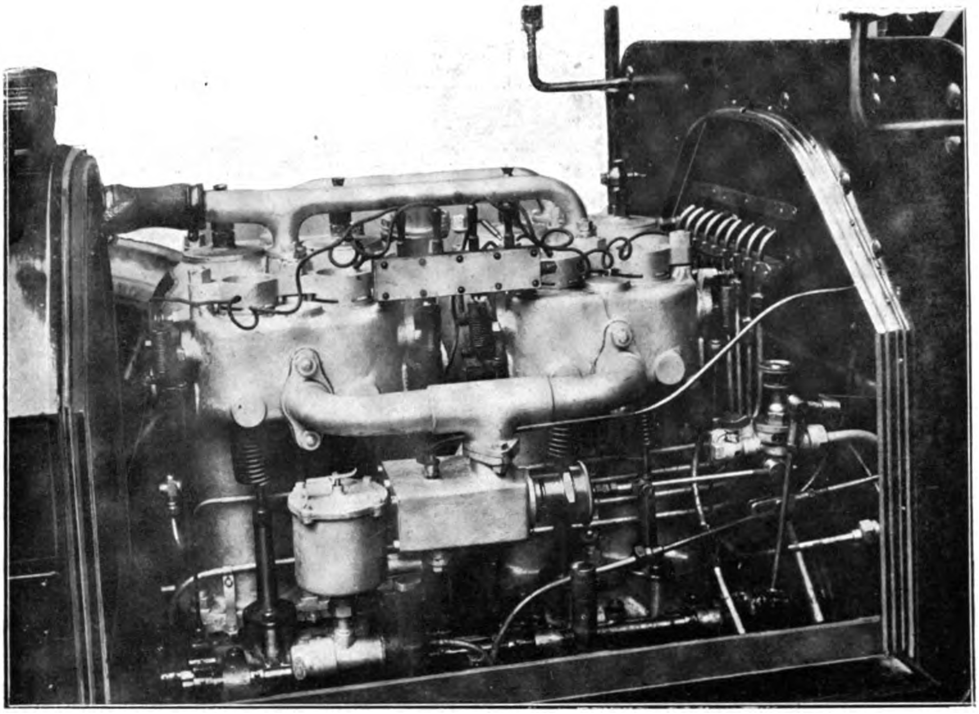


FIG. 5.—The 18-28-h.p. Mercedes Engine from the Left Side.

needle can be turned by it through about 90 degrees to give the extreme range of adjustment which is likely to be required.

The low-tension igniters are fixed in precisely the same position as before, and are connected with contact plugs which fit into sockets placed in a similar position. The igniters are operated by an exposed cam-shaft on this side of the crank-chamber, and the time of ignition is variable from the second lever above the steering-wheel, as it was last year. The pressure valve, connected with the exhaust-pipe, is of the same construction as formerly, and maintains the necessary pressure, both on the petrol tank and the tank containing the lubricating oil. The hand-pump for the same

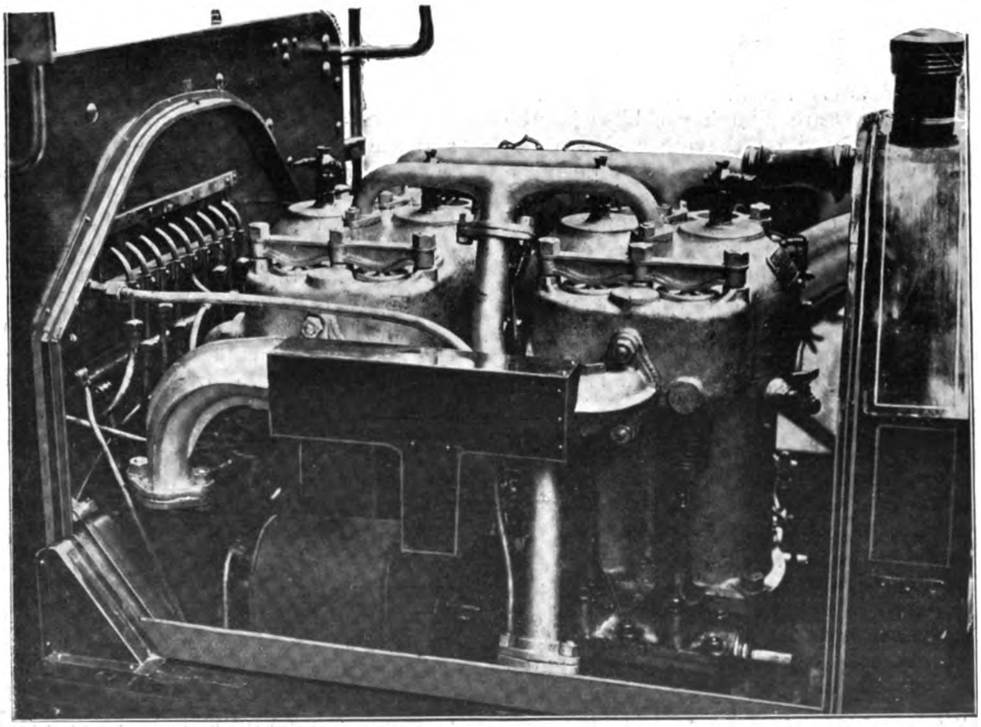


FIG. 6.—The 18-28-h.p. Mercedes Engine from the Right Side.

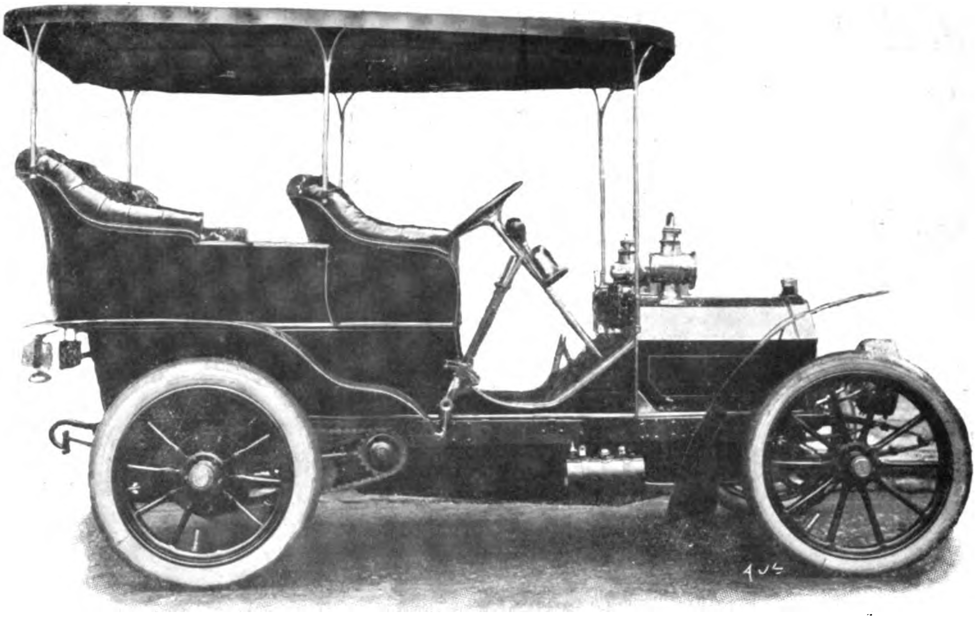


FIG. 7.—The 1904 18-28-h.p. Mercedes Car.

purpose, too, is fixed to the floor-boards near the dash on the left side, and is intended for use when the engine is at rest.

The fittings on the dash are well shown in Fig. 2, and are practically the same as before, except for the spray jet control lever. It will also be noticed that two brake pedals in addition to the foot pedal are provided. The main clutch is practically unchanged, being of the expanding type and mounted centrally in the fly wheel, which forms a fan for the honeycomb radiator. The change-speed-gear has not been materially altered, and the side lever with its safety catch for the reverse is identical with last year's models.

The 18-28-h.p. car is very different in several respects from the 18-22-h.p. 1903 car. It not only has a larger engine, but the chassis is lengthened by about five inches. The inlet-valves are interchangeable with the exhaust valves, and are fitted on the other side of the cylinders. This vehicle, with a special Roi de Belge body, is seen in Fig 7, and the engine is shown from either side in Figs. 5 and 6. The carburettor is of the same new type as on the 40 h.p. car, and the effective size of the spray jet is variable from a small horizonal lever fixed to the dash on the left side. The low-tension igniters and the inlet valves are on the left, the exhaust-valves being on the right. The inlet-valves have a constant lift, and the time of ignition is altered from above the steering wheel as on the larger model. Each pair of inspection covers above the valves is held down by a yoke and three nuts, and the yokes above the inlet-valves are so shaped that high tension ignition plugs can be fitted into the cover if ordered. The water is led into the jackets, and out from them, by pipes entering above the cylinders, the inlet pipes passing down through the jackets to the bottom. The pump and the magneto are driven from the centre of the cam-shaft as seen, and the gear wheels driving the cam-shafts, which are not enclosed, are arranged at the rear end of the engine. The governor regulating the throttle is subject to the control of the hand-lever above the wheel and is fitted into the spur wheel on the inlet cam-shaft.

The axles on this car have been considerably strengthened and are made of different metal this year. The engine gives about 28-b.h.p. at its normal speed, and the car is capable of running at about 20 per cent. higher speeds than before. Ball bearings are employed throughout, the pedals are arranged so as to be pushed forward by the driver's foot, the foot brake (which is connected with the clutch) is water cooled, and the expanding side brakes are compensated by a steel cable. A pressure is maintained on the fuel and oil tanks as on the larger car, the clutch is of the internal expanding type, and the vents for the crank-chamber are brought out close to the main frame on the left side.

As if the ordinary racing cars of the present day were not as fast as the nature of the roads will permit, M. Dobelli, an engineer from Rome, has constructed a 4-cylinder petrol motor capable of developing 200-h.p. at 1,300 revolutions per minute. Mounted on a racing chassis, this monster is exhibited at the Turin Salon. The bore of the cylinders is 248 mm. and the stroke 160 mm., while the wheel base is 3·60 mm., and the road wheels are geared up to 124 miles an hour on the highest speed. So far, we understand, this machine has not been tried.

THERE is quite an outcry in Germany about the tax on automobiles which the municipal authorities of Frankfort-am-Main—a town which is becoming specially interesting to automobilists on account of its proximity to the Gordon-Bennett Course—propose to levy. This automobile tax will be no joke, as it is suggested that an impost of £10 per automobile should be imposed. It is of course very silly to attempt to cripple a growing industry in this way. Let us hope that if the tax is ultimately imposed the automobilists of Frankfort will experience a corresponding relief in the absence of police persecution.

THE ALBANY "SILENT SAFETY" PETROL CAR.

The light petrol car which has recently been put on the market by the Albany Manufacturing Company is of unusual construction in many respects, and is termed the "Silent Safety," because special provisions have been taken for rendering the exhaust gases noiseless, and for preventing the vehicle from driving the engine when running down hill. A single-cylinder water-cooled horizontal engine is employed, and the power is transmitted from it to a change-speed-gear, through a main clutch, and through worm-gearing. The drive is then direct on the top speed, through a universally-jointed propeller-shaft to a live-rear-axle, but a lower gear and a reverse are provided by epicyclic trains in the gear-box. Other unusual features on the car, to which special attention should be drawn, are the carburettor, in which an automatic pump replaces any float-feed or other constant level device, the steering gear, and the foot-brake.

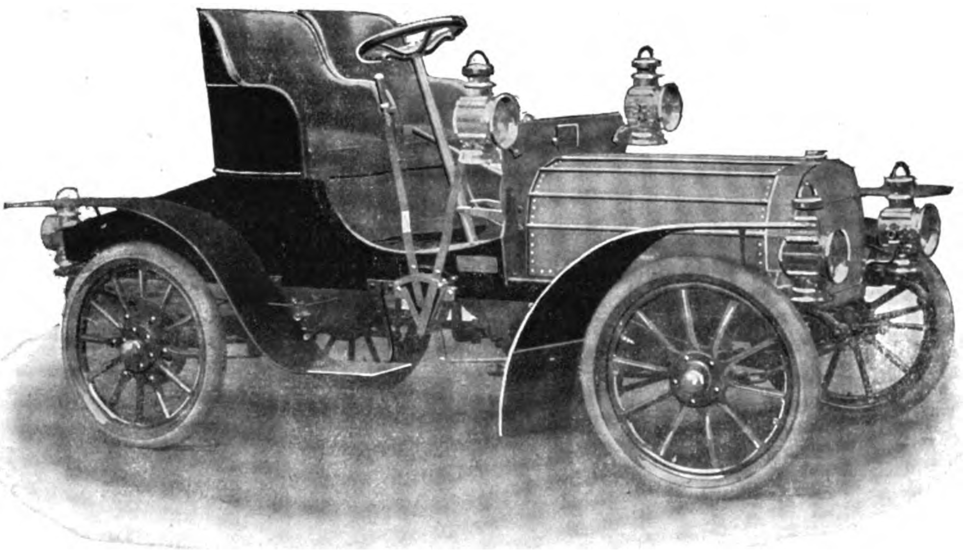


Fig 1.—The Albany "Silent Safety" Petrol Car.

The vehicle, fitted with its two-seated body, is seen in Fig. 1, and the chassis is shown both in plan and in side elevation in Fig. 2. The main frame is constructed of pressed steel, and a channel underframe supports the engine and the gear-box in front. In the latest frames the spring-horns are formed by the frame itself, although in Fig. 2 separate forgings are shown for them. The engine itself is seen in position in the car in Fig. 3, and separately—from the opposite side in Fig. 4. In general design it is somewhat like that on the well-known little Oldsmobiles, though differing from them in several details. It is fixed with the crank-chamber, A^2, lying just in front of the dash, with the cylinder, A^1, projecting forward, and with the crank-shaft, B, placed transversely. The flywheel, B^2, is fixed close up to the crank-chamber, and lies central in the chassis. The cylinder is water-jacketed, and the valves, which are both mechanically operated, are placed vertically in the underside of the head. The valves are accessible through a removable plate fixed in the upper portion of the head, and the high-tension ignition plug, A, is screwed into the plate. The cam-shaft passes along the right-hand side of the engine, and is driven by enclosed spiral gear-wheels from the crank-shaft. The cylinder has a bore of 5 ins. and the stroke is 6 ins. The compression is about 80 lbs. per sq. in., and the engine develops about 10-b.h.p. at 1,000 revs. per min.

The commutator is fitted on the back end of the cam-shaft, and a semi-rotary pump is operated by a cam, which is also fixed to this same shaft. The water is circulated through one of the maker's "Venetian" radiators, which forms the front of the bonnet; in it, the water flows down in a thin film through flattened vertical tubes, placed edgewise. The ends of the tubes are expanded so as to fit against one another, and to leave sufficient air space between them.

The exhaust gases are led to a large silencer, which is also fixed beneath the bonnet, in a vertical position, and in the latest models the gases are first allowed to flow through a kind of turbine, which drives a fan for drawing air through the radiator. The exhaust box, A^3, itself has a large expansion chamber into which the gases are led through a slotted grid, which splits them up and reduces their velocity. They then find their way through perforations in the walls of the central chamber, and finally pass out to the atmosphere through a tube in which diagonal slots are cut.

The crank-shaft, B, together with the main-clutch and the driving worm-wheel, are seen in Figs. 6 and .7 The crank-shaft carries the spiral gear-wheel, B^1, near its one end, and it is this wheel that drives the cam-shaft. The flywheel, B^2, is fixed on its other end, and the outer member, B^3, of the internal cone-clutch is bolted to the flywheel. The inner clutch member, C, which has a friction face built up of several discs of leather as seen in Fig. 7, rides upon the square end of the shaft, D^2, to which is fixed the driving worm-wheel, T. The clutch is normally held in engagement by an internally-mounted helical spring, ball bearings being provided on each side of the sliding member to take the end thrust when the clutch is disengaged. The clutch is thrown out of engagement by a lever arm, C^2, which is solid with an internally-threaded sleeve, riding upon similar threads formed on an inner sleeve, C^1. The sleeve, C^1, is mounted freely upon the shaft, D^2, and acts as a bearing for it. The other end of the sleeve, C^1, has a spur-wheel, C^4, formed upon it, and this wheel meshes with a small pinion fitted on a pin, C^5, which can be securely fixed and adjusted in the upper portion, D^1, of the gear-box. The pin, C^5, can be turned round by a spanner when its lock nut is slackened, and thus the sleeve, C^1, can be rotated to adjust the clutch when necessary. The clutch is operated by the foot-pedal, C^3, visible in Fig. 2, in much the usual way, and the clutch is so connected with the carburettor that the engine is automatically slowed down when the clutch is thrown out of engagement. The main portion of the gear-box is formed by two castings, G^1, the upper of which, together with the casting, D^1, also encloses the driving worm-wheel, D. A view of the lower portion of the gear-box, together with the change-speed mechanism fitted in place, is given in Fig. 5, which, taken in conjunction with Fig. 7, renders the arrangement clear. The shaft, L, carrying the change-speed-gear, lies at right angles to the crank-shaft and to the shaft, D^2, the power being transmitted to it by the worm-wheel, G, which is mounted above it. Epicyclic trains of gearing, H and J, are fitted on this lower shaft, L, on either side of the wheel, G, and these trains normally run as though they formed a solid part of the shaft, and were rigidly connected with the wheel, G. A direct-through-drive is then obtained from the wheel, G, to the universal joint, L^1, to which the propeller-shaft is attached, for the epicyclic trains are locked solid by clutch pins, K^2, projecting from a sliding sleeve, K. The sleeve, K, is engaged by a fork, K^1, which rides in a groove in it, and this fork is fixed to a transverse shaft, K^6, in the bottom of the gear-box, the shaft, K^6, being connected with the change-speed-lever. The fork, K^1, is also connected with sliding bars, K^3, which fit into grooves formed between the upper and lower portions, G^1, of the gear-box. These bars, K^3, have projecting teeth, K^4 and K^5, which are so arranged as to engage with corresponding slots in flanges forming part of the epicyclic trains, H and J, respectively. As the fork, K^1, is moved by the hand-lever, it alternatively holds the external member of the epicyclic train, H, stationary, introduces the "reverse," or does the same thing for the train, J, to provide the low speed, or it causes the pins, K^3, to lock the wheel, G, rigidly to the shaft, L, for giving the top speed.

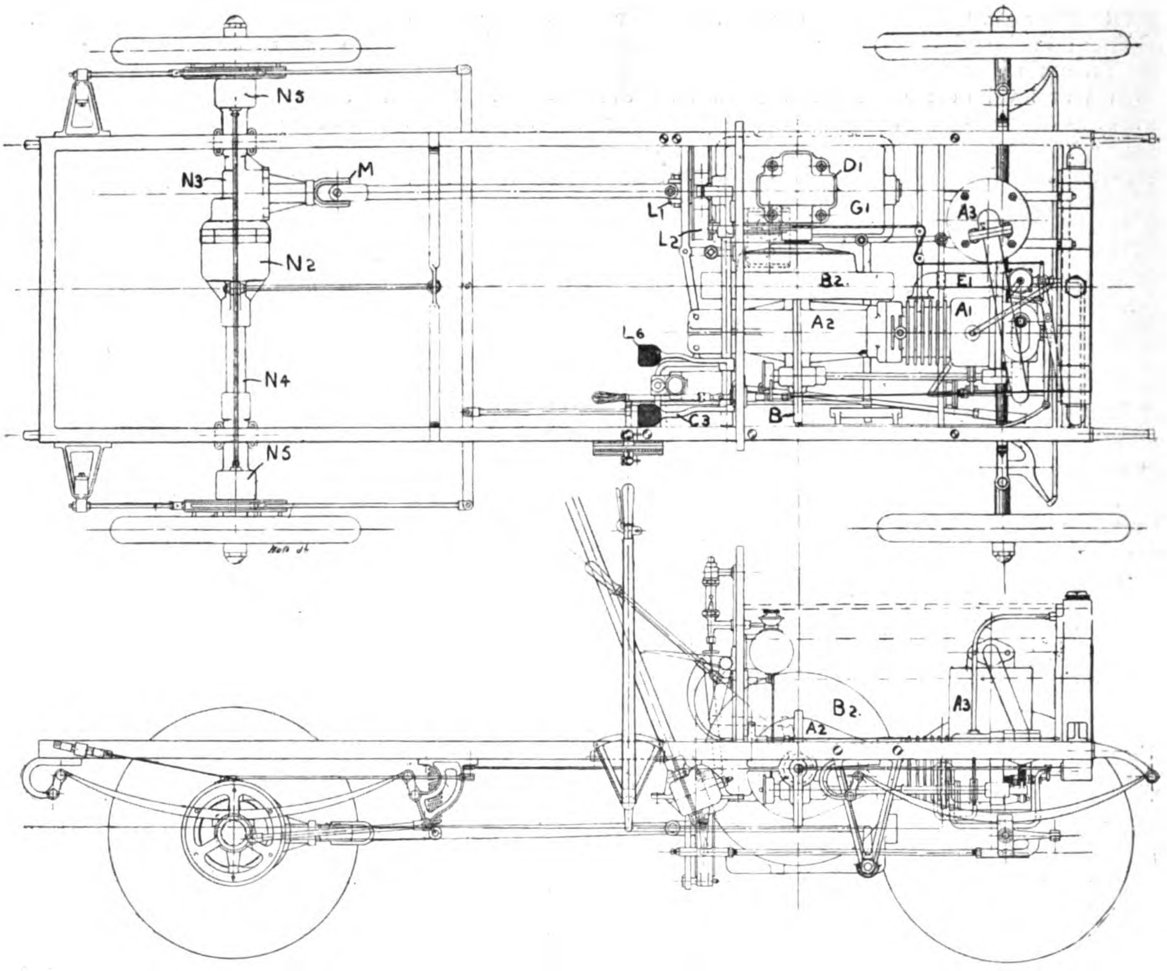


FIG. 2.—Plan and Side Elevation of the Albany "Silent Safety" Petrol Car.

The worm-wheels, D and G, are so designed that although the former can drive the latter, yet the latter cannot drive the former. It is assumed that greater safety is secured by this arrangement, because the car is unable to drive the engine when running down hill, and because the gear thus forms a kind of brake, which

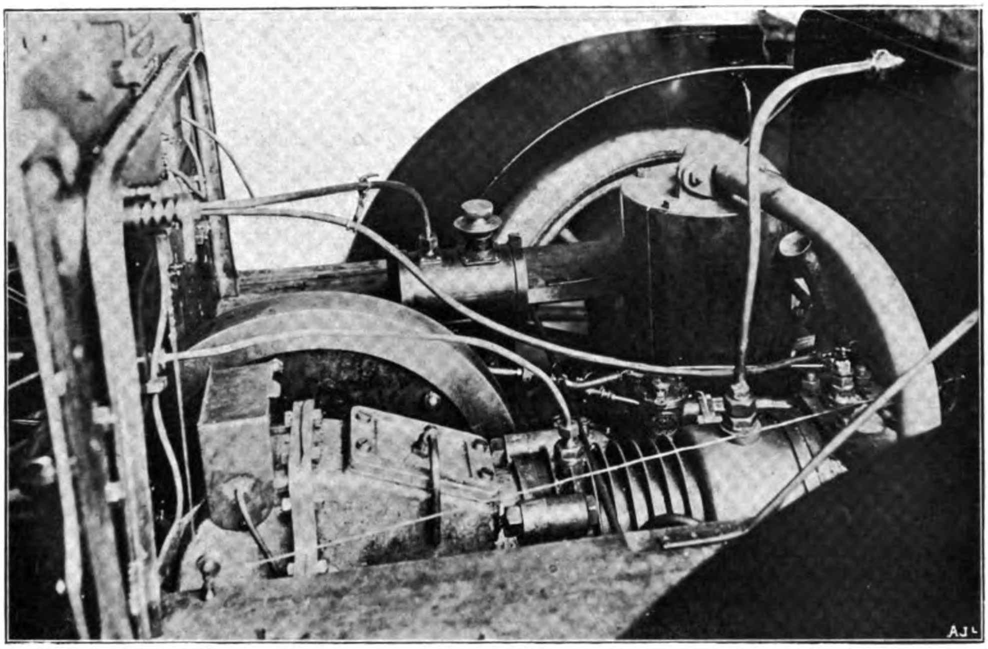


FIG. 3.—View of the Engine in the Albany Car from the left side.

can be instantly applied by withdrawing the clutch. It is also pointed out that the car is unable to run backwards if the engine should stop when climbing a steep hill. It is, perhaps, however open to question whether any greater all-round safety is secured under abnormal conditions, for, as against the above mentioned advantages, it might be contended that if anything caused the engine to come to rest suddenly, or if the clutch were to slip, whilst the car was travelling at any speed, the consequences might be disastrous to the passengers.

The propeller shaft has an ordinary universal joint, L^1, at its forward end, and the brake-drum, L^2, is fixed to the shaft, L, just outside the gear-box. The drum is surrounded by two shoes, L^3, which are hinged together on the underside, and terminate in lugs at their upper ends. The shoes are normally forced apart by a pair of coiled springs, and they are drawn together by the disc cams, L^5, which are fitted on a short shaft passing through holes in the lugs on the shoes; the lever, L^4, is also fixed between the lugs to this same shaft, so that when it is moved by the brake pedal, L^6 (Fig. 2), it causes the cams, L^5, to turn with their shaft, and thus to force the shoes together.

The flexible joint, M, at the rear end of the propeller-shaft, which connects it to the short shaft, M^2, is of somewhat unusual construction, a couple of rollers being introduced between the inner and the outer portions, so as to give the necessary flexibility, and to allow for a certain amount of longitudinal motion. The construction of the back axle is well shown in Fig. 8, in which the two portions, N^2 and N^3, of the casing surrounding the differential gear, N^1, and the bevel-wheels, N and M^1, are separated from one another to show the internal mechanism. The bevel-wheel, M^1, is as usual fixed to the shaft, M^2, and the bevel-wheel, N, to the outer member of the differential-gear, N^1. The differential is of the spur-wheel type, and the two halves of the live-axle are carried in plain bearings on each side of it. The stationary portions of the axle, which are rigid with the castings, N^2 and N^3, consist of two end castings, N^5, the one of which is connected by the tube, N^4, with the casting, N^2. The castings, N^5, carry the semi-elliptic side springs, and they contain self-

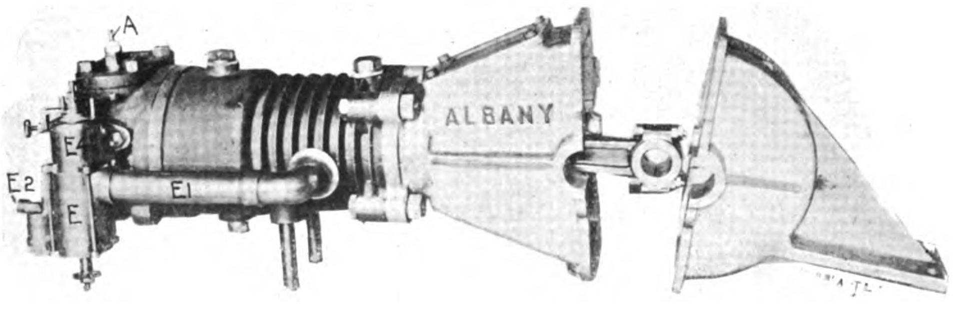


FIG. 4.—The Albany 10-h.p. Engine, fitted with the Carburettor.

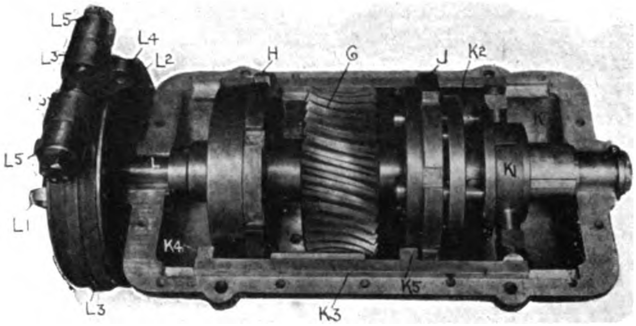


Fig. 5.—The Change-speed-gear on the Albany "Silent Safety" Petrol Car.

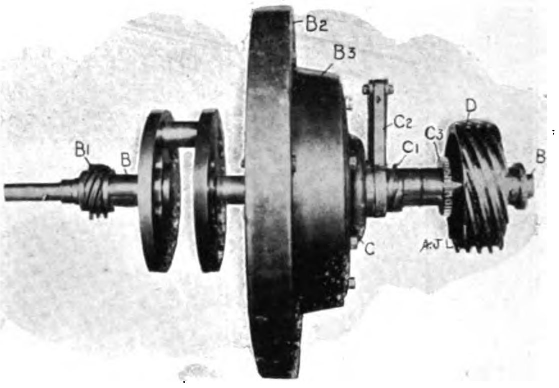


Fig. 6.—View of the Crankshaft, together with the Main-clutch and Driving-Worm-wheel.

aligning ball bearings having four rows of balls—two rows for the thrust and two for the bearing proper. The back axle is tied to the main frame by radius rods at each side, for taking the drive, and by a central rod for taking the twisting strain; the central rod is at its forward end connected with the frame by a helical spring.

Brake-drums are fixed to the hubs of each of the rear wheels, and their bands are operated through a compensating beam from a hand-lever beside the driver. The other ends of the brake-bands are attached to brackets projecting from the main frame at the rear, trunnions and adjustment nuts being introduced for giving flexibility and for taking up any wear, respectively.

The carburettor now in use is seen fitted to the engine in Fig. 4, and is shown separately in Fig. 9. The latest design, however, differs somewhat from it and is seen sectionally in Fig. 10. The leading characteristics are, however, the same as before, but as it has been simplified in the new design, we propose to restrict our description to that, though similar letters are employed for similar parts in all the illustrations. The carburettor is bolted direct to the cylinder-head by the flange, E^5, which forms a part of the upper portion, E^4, the combustible charge passing from this upper casting, through the joint made by the flange, to the inlet-valve on the engine. The whole of the air is led from the neighbourhood of the hot cylinder wall by the pipe, E^1, and the petrol pipe is connected to the union joint, E^2, at a lower level on the opposite side. The main portion of the carburettor consists of three parts, E, E^3, and E^4, these being held together by four bolts. The central portion, E, forms the spray jet which projects up centrally into the upper portion, E^4, and the lower portion, E^3, is closed at the bottom by a diaphragm, E^7. The flow of petrol from the union, E^2, to the jet is controlled by a kind of pump, E^8, which is fitted centrally to the casting, E, and lies inside the casting, E^3; this pump consists of a conical chamber, which is in open communication at its upper end with the spray jet, and is closed at its lower end by a diaphragm. The diaphragm is normally forced downward by the helical spring, as seen, and this diaphragm presses against the centre of the larger diaphragm, E^7. The pump, E^8, therefore forms an extensible and compressible chamber, which can act in the same way as an ordinary plunger pump. As its diaphragm descends, it draws in a charge of petrol through a ball-

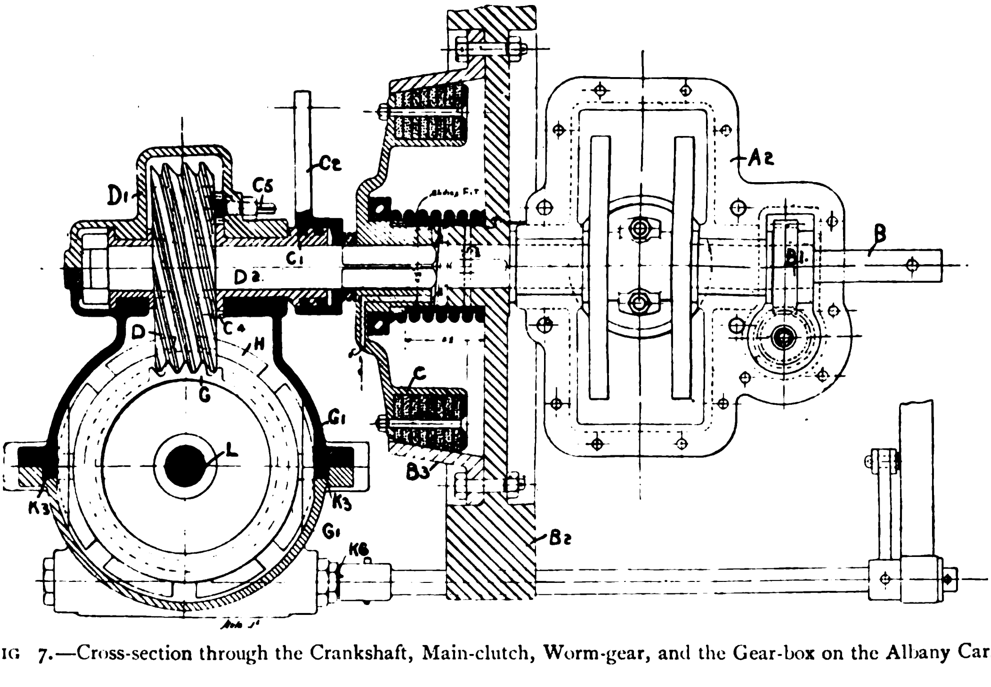


Fig 7.—Cross-section through the Crankshaft, Main-clutch, Worm-gear, and the Gear-box on the Albany Car.

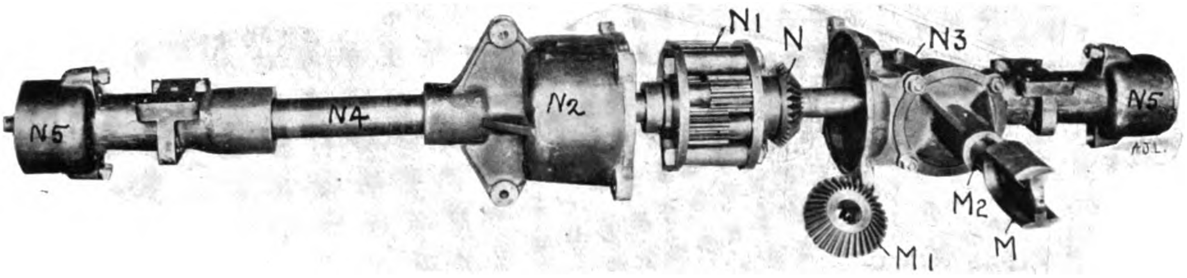


FIG. 8.—View of the live-rear-axle, with the casing surrounding the differential gear taken apart to show the mechanism inside it.

valve arranged in the feed pipe beneath the plug, E^6, the top of the nozzle is then closed by a needle, F^1. When the diaphragm is raised, a charge of petrol is forced out through the jet, and is sprayed up into the mixing chamber, E^4, since it cannot find its way back past the ball-valve to the petrol tank. The pump, E^8, is operated by the suction of the engine, and by the partial vacuum formed in the mixing chamber during each intake stroke. The quantity of petrol delivered by the pump, therefore, depends upon the degree of vacuum which is formed in that chamber, and this, in turn, depends upon the speed of the engine, and upon the freedom with which the air can enter through the pipe, E^1. Two perforated caps, E^9 and E^{10}, are fixed between the castings, E and E^4, so that they project up centrally into the latter. The one cap, E^{10}, forms an induction cone around the spray nozzle, and a certain amount of air is at all times able to enter it, through the perforations from the pipe, E^1, and to pass up between it and the nozzle. The outer cap, E^9, has two slots of the shape shown in dotted lines in Fig. 10 cut in it, and it is surrounded by a sleeve, F, having similarly shaped holes cut through it so as to correspond with those in the cap, E^9. The sleeve, F, forms the lower part of a casting which projects through the top of the upper portion, E^4, of the carburettor, and it is mounted in such a way that it can be turned about its axis by the external, projecting arm, F^5. The upper and lower portions of the casting, F, are connected together by arms which do not interfere with the free passage of the mixture to the engine, and the upper portion forms a guide for the needle, F^1, above the jet. The needle is lifted during the suction strokes of the engine by the air impinging upon the cone, F^3, which is fixed to it, and the extent to which it can lift is regulated by adjusting the screw-stop, F^2, above it. A portion of the air can at all times find its way through the caps, E^9 and E^{10}, beneath the jet, as we have already said, and a variable quantity of additional air can also enter the mixing chamber through the holes in the cap, E^9, and in the sleeve, F. When these holes are made to more or less correspond with one another, the air entering through them is caused to pass over the top of the spray jet by the sleeve, F^4, which is held in position between the sleeves, E^9 and F, as seen. It will be noticed that in this carburettor the quantity of mixture admitted to the working cylinder depends upon the position of the sleeve, F, and the lever, F^5, and it will also be noticed that the mixture tends to become richer as the quantity is reduced, instead of remaining con-

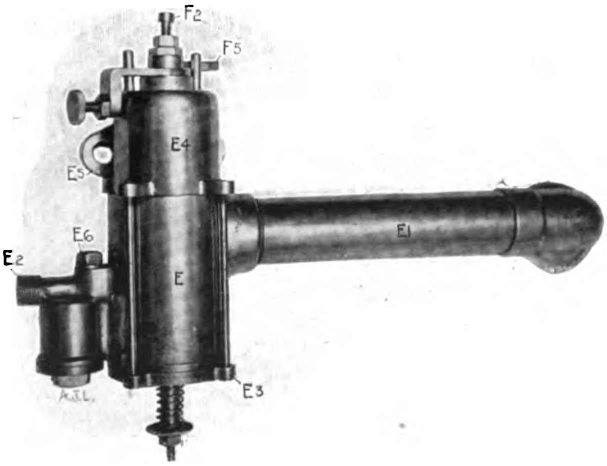


FIG. 9.—View of the Albany Carburetter.

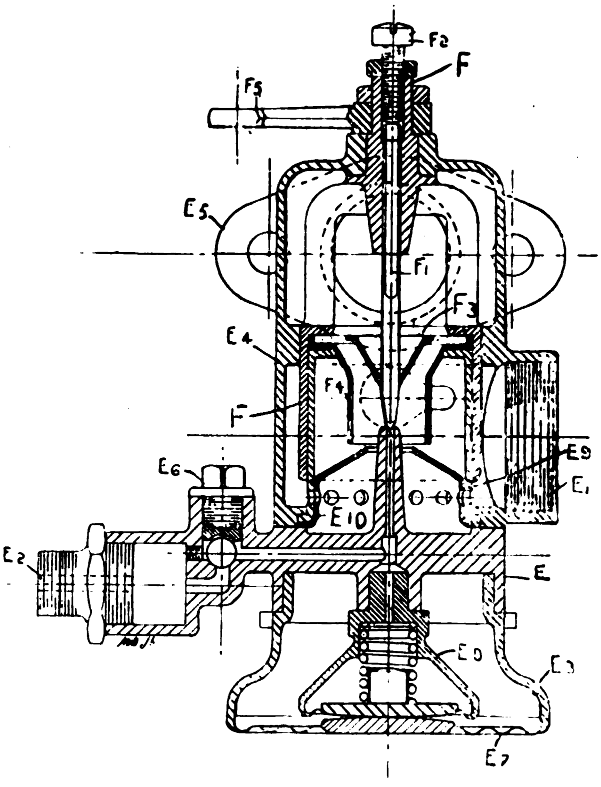


FIG. 10.—Cross-Section of the latest Albany Carburettor.

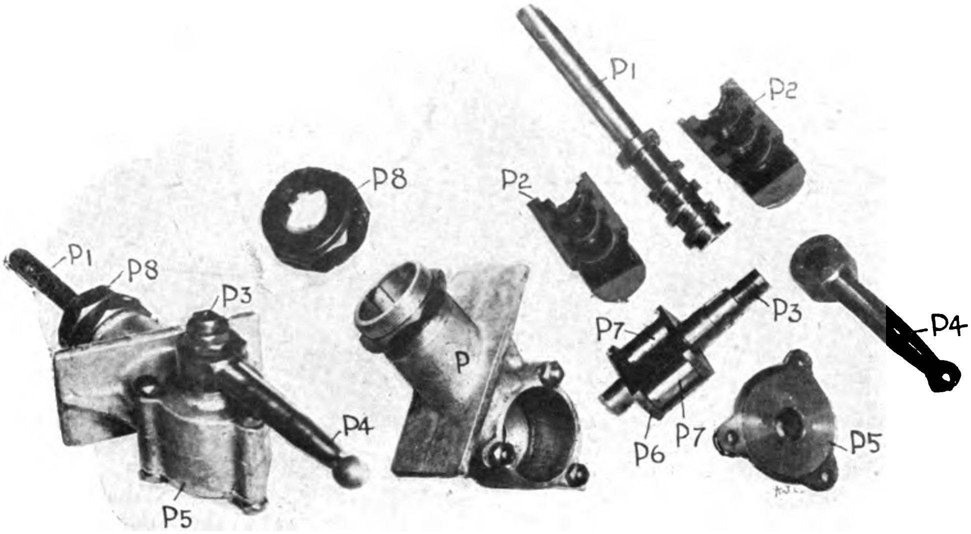


FIG. 11.—The Albany Steering Gear, shown complete and in parts.

stant as is aimed at in most automatic carburettors. The steering-gear, Fig. 11, is of a somewhat novel form. The casing, P, receives the inclined shaft, P^1, to which the steering-wheel is connected, this shaft passing through the top of the casing, and being provided with ball thrust bearings which can be adjusted by the nut, P^8. The shaft has three spiral threads formed upon it, and these engage in corresponding grooves in the two portions, P^1, which fit together and surround the end of the shaft. The arrangement is such that, as the shaft is turned by the steering-wheel, one portion, P^2, is forced upwardly whilst the other portion is forced downward. Beneath the sloping shaft, P^1, is mounted a short horizontal shaft, P^3, which is also carried in bearings in the casing, P; the one bearing is formed in the removable cap, P^5, which is bolted to the casing, P. The shaft, P^3, inside the casing, is rigid with a cradle, P^6, in which are mounted a pair of rollers, P^7. The two portions, P^2, rest upon the rollers, P^7, so that, as the one ascends and the other descends, the cradle, P^6, together with the shaft, P^3, are caused to rock in their bearings. The steering-arm, P^4, from which the usual rod passes to the steering-head of the off front wheel, is securely fixed to the one end of the shaft, P^3, so that the action of the steering-wheel on the front wheels is the same as on most cars, although the mechanism inside the casing, P, is so different. This form of steering-gear is irreversible, and is also employed by the company on their larger vehicles. In certain cases a different form of mechanism is used for the small car with which we are now dealing, and it gives a quicker action than that shown in Fig. 11.

The engine is fed with oil through a lubricator on the dashboard from a tank placed below the level of the water tank. The water is allowed to displace the oil in the tank, causing it to pass through the lubricator, the glass of which is also filled with water. Should the lubricant contain anything heavier than water, such as grit, it therefore tends to fall to the bottom and cannot find its way to the engine.

The speed of the engine is controlled by varying the time of ignition, and by regulating the carburettor, the hand-levers for which are attached to the steering pillar; the carburettor is also connected with the clutch, as we have already said. A half-compression cam is provided for rendering starting of the engine easy, and this is brought into operation automatically when the starting handle is in use.

WHEN journalists let themselves go on the subject of the dangerous character of the motor car they should bear in mind how much more dangerous, as we have repeatedly pointed out, is the ordinary covered van which has hitherto been specially so constructed that the driver is incapable of seeing anything coming behind him, anything on either side of him, and not too much of what is going on in front of him. In reply to a question in the House of Commons, Mr. Akers Douglas stated that there were 1,425 accidents last year resulting in personal injury caused by these same covered vans, 29 out of the number being fatal. When next daily newspaper journalists wish to raise the cry of "Juggernaut," we would recommend the covered vans to their special attention. May 1st will be looked forward to, when the new regulations of the London County Council come into force, whereby these vans have to be so constructed as to give an uninterrupted view to the driver.

OUT of 50,000 square feet apportioned for the display of automobiles at the St. Louis Exposition, 40,150 square feet have been allotted to American manufacturers.

A CHATTY daily paper points out that motor car driving is becoming quite a profession for younger sons of families of position who have failed to get into Sandhurst or pass other examinations that are necessary for many careers, though we rather imagine that £6 a week, the estimate our daily contemporary makes of the wages such gentlemen drivers are able to command, is somewhat excessive. Their position in many cases is apparently not an unpleasant one, and really there is no reason why it should be anything else. For the decay of snobbishness is certainly a general characteristic of the present day, and the motor car movement is helping it.

THE CROSSLEY VARIABLE CUT-OFF VALVE.

THE object of this valve is to enable the volume of the charge which is drawn into the working cylinders of the petrol engine to be varied, and yet to maintain a full opening between each cylinder and the carburettor during the whole time that any charge is being drawn in. By this means the fuel consumption is reduced when the engine is running on light loads, and constancy in the richness of the mixture does not depend to any great extent upon the perfection of automatic devices in the carburettor itself. The difference in effect between a variable cut-off mechanism of this description, and an ordinary throttle-valve, is that in the former case the volume of the charge depends but little upon the actual speed at which the engine is running, whereas, with a throttle valve, the amount of mixture drawn into the cylinder varies as the engine-speed varies.

The two main portions of the Crossley valve are seen in Fig. 1, and the complete mechanism, together with the gear-wheels driving it, is shown sectionally in Fig. 2. Referring to these illustrations, the lettering of which corresponds with that employed in our previous descriptions dealing with the new Crossley car, F is a cylindrical casting, into the base of which the induction pipe, F^1, from the carburettor passes. The mixture normally passes freely through the casting, and is conducted by pipes, F^2 and F^3, to the four cylinders, the former leading to the two inner cylinders, and the latter branching off right and left to cylinders No. 1 and No. 4. Each pair of cylinders grouped in this way operate at the same moment, alternately for each revotion, and, therefore, so far as the cut-off-valve is concerned, this device may be regarded as though it were controlling the passage of the explosive charge to two cylinders only—each giving an explosion every revolution—and set with its crank opposite the other.

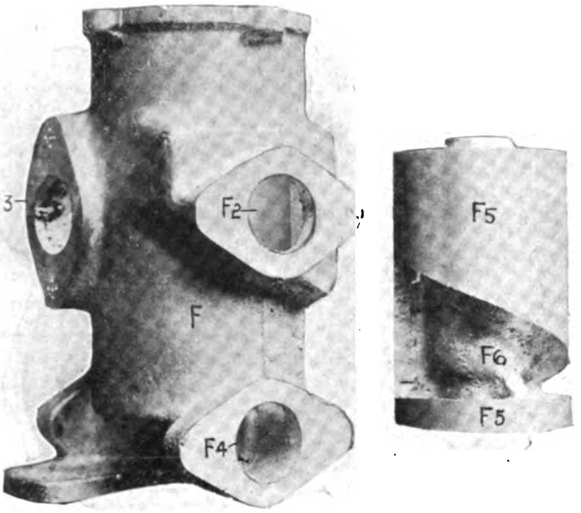
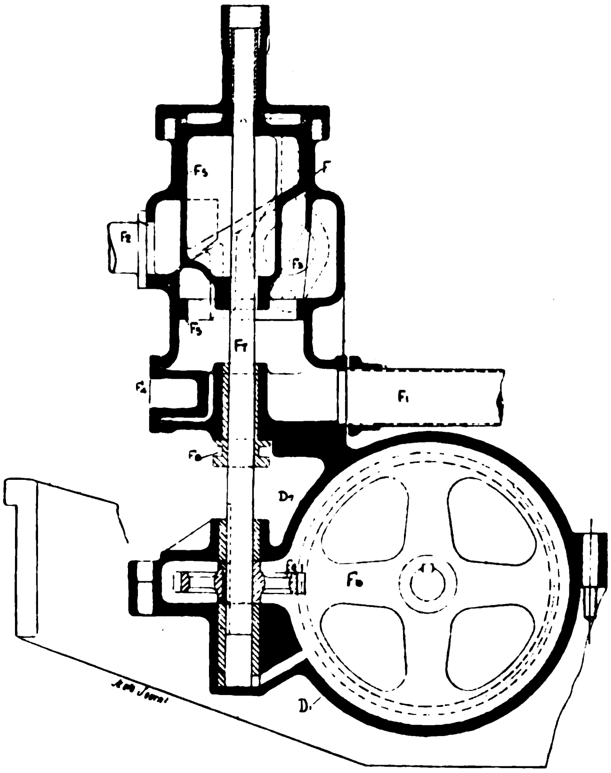


FIG. 1.—The Crossley Cut-off Valve. The Main Casting, and the Piston Valve which revolves inside it.

It should perhaps be explained that the port opposite the induction valve, F^1, is closed by a cap, F^4, this being only provided for use on engines in which it is more convenient to bring the induction pipe, F^1, in at this side than at the other.

The cylindrical valve, F^5, which fits inside the casting, F, is fixed to the vertical spindle, F^7, by which it is caused to revolve. The spindle is so mounted that it can be moved up and down in its bearings, carrying the valve with it. The valve revolves at the same speed as the crank-shaft of the engine, and is driven by the spiral gear-wheels, F^9 and F^{10}, off the inlet cam-shaft, a feather key being fitted between the wheel, F^9, and the spindle F^7, to allow the latter to slide.



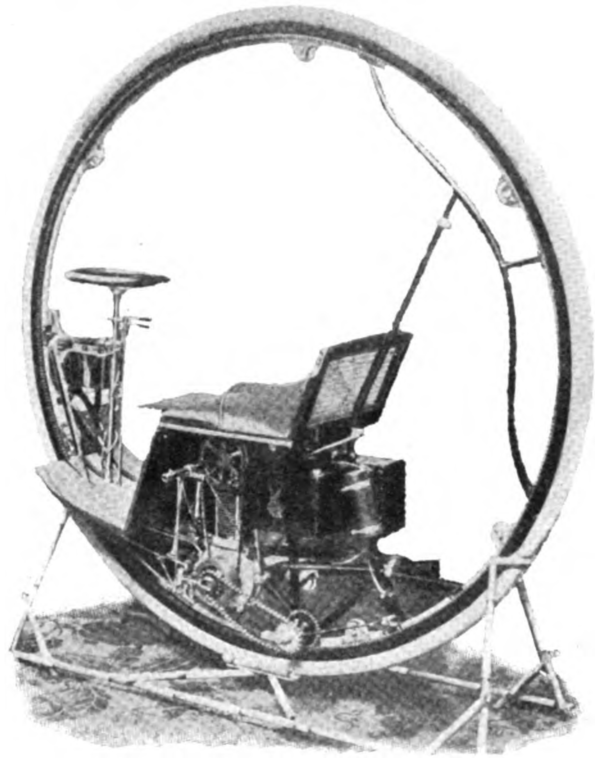
[FIG. 2.—Cross Section of the Crossley Cut-off Valve, and of the Gear-Wheels by which it is driven from the Inlet Cam-Shaft.

The valve, F^5, is formed with a large wedge-shaped port, F^6, and similarly shaped cavities are provided on either side in the casting, F, where the pipes, F^2 and F^3, are connected with it. The lower portion of the valve, F^5, forms a cylindrical guide, and is like a ring through which there is always free communication to the port, F^6. As the valve revolves, the port, F^6, in conjunction with the cavities in the casting, F, always affords an open passage for the explosive mixture to the pipes, F^2, and to the pipes, F^3, at the beginning of the suction stroke in the cylinders to which they are respectively connected, but it will readily be understood that the flow of mixture to the cylinders will be cut off earlier or later by the sloping edges of the ports according to the vertical position of the valve, F^5, inside the casting. When this valve is in its uppermost position (as in Fig. 2) the through passage is only closed at the end of each suction stroke, the port, F^6, being then open to the pipes, F^2, during one half revolution of the valve, F^5, and being open to the pipe, F^3, during the second half revolution. As the valve is lowered, however, the passage of the gases is cut off earlier and earlier in the stroke, with the result that a partial vacuum is formed during the latter portions of the inlet strokes in the working cylinders.

The valve, F^5, is raised and lowered by a forked bell-crank lever which engages in a groove in the sleeve, F^8, this sleeve being fixed to the spindle, F^7. In the engine shown in the illustrations which we have given recently (Fig. 4, page 109, and Fig. 3, page 174, in last week's issue), the bell-crank lever referred to carries a counterweight (G^2) which balances the weight of the valve, F^5. The valve is connected with the centrifugal governor so that it lowers the valve, F^5, as the engine-speed increases.

A MOTOR UNICYCLE.

A novel departure in self-propelled "vehicles" was exhibited at the Turin Automobile Salon, in the shape of a one-wheeled motor cycle, the above photograph of which we reproduce from *L'Automobile*. As will be seen, it consists of a large wheel about 6 ft. 6 ins. in diameter, shod with a pneumatic tyre, and forming internally a large gear-ring. Floating in the centre is a seat, under which the engine and driving mechanism are situated. The large wheel is driven by the motor through a chain and pinion which meshes with the gear ring. One naturally wonders at first just how such a freak may be steered, and whether the hand wheel in front is merely to give the driver confidence; apparently it is accomplished by rocking over the rider and his seat to either side, the seat being connected to the steering-wheel for that purpose.



Baron de Forest, who made the sensational speed records in Ireland last year in the races following the Gordon-Bennett Cup event, was married on Thursday morning last week to the Hon. Ethel Gerard, only daughter of the late Lord Gerard, and sister of the present peer. Baron de Forest is the adopted son of the late Baron Hirsch.

CLUB DOINGS.

Hertfordshire Automobile Club.—The opening run of this club is announced to take place on March 19th.

Leicestershire Automobile Club.—Mr. E. G. Mawbey occupied the Chair at the first annual dinner of this club, which was held last week at the Bell Hotel, Leicester. Amongst those present were Colonel L. L. Powell, V.D., Messrs. J. A. Corah, H. A. Hamshaw, T. C. Aveling (Secretary Birmingham Automobile Club), W. Lumley (Chief Constable), Dr. Hewlings, Dr. West, Dr. Mason, Messrs. McAlpin, Parker, Harris, Harding, Doran, Gerrard, Wildt, Binns, Boam, Rowe, King, Hales, E. S. Staples, A. McAlpin, Morley, Peberdy, Earp, Barron, Whitby, Wait, Bolts, Hubbard, Taylor, Faulkner, Reynolds, Walker, Perkins, Oliver, M. Mawbey, and O. Wright. Colonel Powell proposed the club and its President, in which he eulogised the splendid work done by Mr. Mawbey during his term of office. The Chairman, he stated, had never missed a committee meeting, in spite of the enormous calls upon his time as a business man. Mr. W. Lumley, Chief Constable, who responded on behalf of the visitors, said it was a pleasure for the ruling authority to admit that automobilism had come to stay, and to protect it so that they might all enjoy that liberty they were all so proud of. He should like to see every owner of a car in the district a member of the club. It was the greatest strength the authorities could have. Every member was then anxious that every other member should obey the law and not override other people who had equal rights to the road. Both he and all the members of the force in that part of the world were anxious to assist motor car drivers in every respect.

During the evening some excellent songs were contributed by Messrs. Alfred Page, E. Statham Stables, Master Bennie Barrow, &c.

North-East Lancashire Automobile Club.—Upon the occasion of the second annual dinner of this club, held last week at the Old Bull Hotel, Blackburn, a meeting of enthusiastic automobilists, numbering about fifty members of the club and friends, gathered for the evening under the chairmanship of Mr. W. Birtwistle, J.P. The guests included Mr. T. Clayton, J.P., Mr. A. Cayley, J.P., Mr. A. Nuttall, J.P., Dr. Gray, Dr. Stevenson, Mr. G. Sinclair (Chief Constable of Accrington), Superintendent McKeand (Church County Police), Mr. Charles Jarrott, Mr. Siddeley, &c. An amusing menu was presented, which by many of its technical references somewhat confused the uninitiated in the mysteries of automobilism. The various courses were distinguished by the following headings: Lubricants, Clutch In, First Speed, Second Speed, Direct Drive, Measured Length, and Fruits of Iniquity. The various dishes gave little indication of their real constituents, including as they did such titles as "Mushroom Valves," "Braised Body," "Reverse Pudding," &c. The leading speeches were delivered by Mr. A. Birtwistle, Mr. Siddeley, Mr. E. Shrapnell Smith, Mr. Walmsley, (Hon. Secretary), Dr. Musson, Mr. Charles Jarrott, Mr. R. Crossley, and Mr. W. M. Letts, the majority of the speakers dealing with their subjects in a happy and light spirit. The Hon. Secretary, Mr. Walmsley, during his speech, mentioned that the club was formed early in the year 1902 with ten or eleven members, and at the end of last year their numbers had increased to fifty. He was sorry that the club had not made greater progress, but this was, he thought, due to the want of enthusiasm amongst their members. He also announced that he had made up his mind to resign his position of Hon. Secretary.

Considerable enjoyment was experienced during the evening from some recitals and humorous songs.

HOW TO SAVE THE AUTOMOBILE CLUB.

By the courtesy of the Hon. John Scott Montagu, M.P., editor of the *Car Illustrated*, we are enabled to reproduce the following letter, an advance proof of which he was good enough to send us. The subject, to which we refer in an editorial in the front part of the Journal, is of high importance, and we trust, accordingly, that members of the club will see that the gentlemen named are duly nominated, and that they will vote solidly for them.

The importance of the question is emphasised by the fact that His Grace the Duke of Sutherland, K.G., will consent to rejoin the club, and act as its president, should the majority of the proposed committee be elected, while Lord Stanley, M.P., will, in that case, also consent to act as vice-president.

Sir,—There can be no doubt that, although the Automobile Club has increased in numbers, it has, during the last nine months, considerably lost in prestige. The annual general meeting of members is to be held on March 10th, and this meeting will give an opportunity to members to insist that the club shall not be again put in its present position with regard to the exhibition question. *There will be a postal ballot and the last day for nomination will be February 24th.*

The remarks made in the recent issue of the Automobile Club *Journal* are sufficient to show that those who are responsible at the present time for the regulation of the affairs of the club do not understand the gravity of the offence that has been committed by dragging down the club from the very correct and logical position it held in the exhibition matter ever since 1902—namely, that so long as the trade was divided the club would not give its name to either one faction or the other. This unfortunate change of position has apparently been brought about with the acquiescence of Mr. Roger W. Wallace, the chairman, and seems to have been due to the influence brought to bear upon the committee by Mr. Staplee Firth and Mr. Shrapnell Smith, and some others who are open and strong advocates of the Agricultural Hall Exhibition. Some of the other members also appear to have been in favour of the proposal, because they considered that the refusal of the Society of Motor Manufacturers and Traders to agree to the financial and other proposals of the club with reference to patronage, was not couched in sufficiently polite or affable language, and did not imply the recognition of the importance of the goodwill of leading members of the committee. They appear to have thought that the giving of the patronage of the club to the rival show would be a suitable punishment for those who had dared to reject the club's proposals, and to have overlooked that, in endeavouring to punish the manufacturers and traders, they were at the same time dealing a deadly blow at the club's prestige. Such concerns as De Dion, Daimler, Edge, Panhard-Levassor, Thornycroft, Wolseley, and some forty other important firms have, moreover, signed a bond not to exhibit at the exhibition which the club committee is recognising, and which is supported by only part of the automobile trade, generally speaking. I need hardly say that with Mr. Cordingley personally I have no quarrel, and if in the same position should have acted as he has done. I also recognise his enterprise in the early shows, and hope he has by now reaped his reward.

Members of the club would do well to see that some of the gentlemen who are responsible for this deplorable loss in dignity of the club are not again elected to its committees. This they can do, firstly by crossing through their names on any list of the new club committee, and secondly, by being certain to record their vote for not less than a total of fifty other members. How can this be done? As every member cannot be addressed individually, I am anxious to enlist support for a new committee through the Press, which is the only means by which members can be approached. I beg, therefore, to put forward fifty good names, and assuming that these gentlemen will consent to serve, I beg to urge your readers to vote for these fifty, and these fifty only. It is very desirable that every member should vote for not less than the full number.

Firstly, it is important that the club should be reinstated in the position which it formerly held as regards governmental and Parliamentary circles. I therefore suggest the following names:—

1. Sir Edgar Vincent, K.C.M.G., M.P.
2. Mr. George Montagu, M.P.
3. Mr. Henry Norman, M.P.
4. Mr. C. E. Shaw, M.P.
5. Mr. W. T. Bull, M.P.
6. Mr. Arthur Stanley, M.P.

The club's relations with the Continental and American Automobile Clubs have hitherto been most successfully conducted by a gentleman who was one of the automobile pioneers in this country, and I am sure his name should again be put forward as the chairman of the Foreign Relations Committee—

7. Sir David Salomons, Bart.

The scientific, and at the same time practical side could be represented by

8. Sir John Thornycroft, F.R.S., &c.
9. Dr. Boverton Redwood, D.Sc., F.R.S.E., A.C.I.E.

Our relations with the London County Council and with military automobilism could be entrusted as regards both to

10. Lieut.-Colonel Mark Mayhew, L.C.C.,

and as regards the latter especially to

11. Captain C. Skeffington-Smyth, D.S.O.

Although ill-health has prevented him from attending committees, seeing that he is responsible for one-third of the rent of the club's premises, no better honorary treasurer could be found than

12. Mr. Paris Singer.

Trials and technical side of the club might be represented by

13. Colonel Holden, R.A., F.R.S.
14. Major Lloyd, R.E.
15. Mr. Cozens-Hardy, M.I.C.E., M.I.E.E.
16. Mr. Lyons Sampson, M.I.M.E.
17. Mr. R. E. Phillips, A.M.I.C.E., M.I.M.E.

The interest of motor cyclists could be safely entrusted to

18. Professor C. Vernon Boys, F.R.S., and
19. Mr. O'Gorman, M.I.E.E.

The decoration and furnishing of the premises have been carried out in excellent taste in house matters, and should be in the future, as now, in the hands of

20. Mr. E. Keynes Purchase, the honorary architect.
21. Mr. Hugh Weguelin.
22. Mr. Ashton Jonson.

The automobile Press might be represented by

23. Mr. Stanley Spooner, and
24. Mr. H. Sturmey.

Although the latter is not actually connected with the Press now, the fact that he was the first to start an automobile paper seems to give him an undeniable claim, especially as he is now closely in touch with the movement. The general Press should, I think, have at least one representative, and I suggest

25. Mr. C. Arthur Pearson,

who is an enthusiastic motorist.

As unofficial and non-trading members, useful possibly on a finance committee,

26. Mr. Lionel Rothschild.
27. Mr. Frank Butler.
28. Mr. Henry Edmunds.

For knowledge of parliamentary procedure and close study of the legal position of automobilism, we might well rely on

29. Lord Russell.
30. Mr. F. P. Armstrong (barrister-at-law), and Mr. Scott Montagu, M.P., if he would serve, but I understand that he will only do so providing the present committee is radically reformed.*

We next come to the representatives of the trade, and I would propose the following:—

31. The President of the Society of Motor Manufacturers and Traders for the time being (*ex officio*),

and then as representative of the other section of the trade,

32. The Earl of Shrewsbury and Talbot,

or, if his lordship will not stand, a representative of the Automobile Protection Society.

A man who is not frightened to express an opinion, and to express it in a forcible way, is often a useful member of a committee. Such a person would therefore probably be a useful addition; I refer to

33. Mr. W. H. Astell.

The following would probably be acceptable as representatives of the trade, which, considering that the club is a society of encouragement as well as a social club, are quite in their right places if not forming a too large proportion of the club committee:—

34. Hon. Stuart Bouverie (Wolseley Tool and Motor Company).
35. Captain Deasy (representing the Martini Company).
36. Mr. S. F. Edge (Messrs. S. F. Edge and Co.).
37. Mr. C. Jarrott (Oldsmobile Company and Crossley Brothers).
38. Mr. Leonard (Carless, Capel, and Leonard).
39. Mr. Manville (Daimler Company).

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* No. 50 is left blank, but we understand that Mr. Scott Montagu would be willing to fill this vacancy provided that the majority of the other members proposed are elected. Mr. Montagu ought, accordingly, to be nominated in good time.

40. The Hon. C. S. Rolls (C. S. Rolls and Co.).
41. Mr. J. D. Siddeley (Siddeley Autocar Company).
42. Mr. Claude Watney (London Motor Garage).

To represent electricity—

43. Mr. T. Chambers (Electromobile Company),

and steam—

44. Mr. Thomas Clarkson (Clarksons, Ltd.).

It is impossible that all the affiliated clubs should be represented, but the Liverpool, Manchester, and North of England might be represented by

45. Mr. Calthrop,

the Midland Club by

46. Mr A. Bird,

Ireland by

47. Mr. Goff,

Scotland by

48. Mr. R. J. Smith.

There is yet one other gentleman who has had unique experience of the club's affairs—

49. Mr. Claude Johnson, late Secretary of the Automobile Club.

He would certainly be a most invaluable addition, and has done work of great value in connection with the Automobile Club.

Having ascertained that these gentlemen will serve, would it be possible to then ascertain from the Hon. Arthur Stanley, M.P., or some other gentleman of undoubted position whether, subject to this committee being elected, one of them would consent to be the chairman of the club? It cannot, I think, be hoped that anyone will be found to give up as much time as Mr. Roger Wallace has unselfishly done in the past to the chairmanship. In fact, I am inclined to think the club would be well served out if the chairman would consent to attend the monthly meetings of the club committee, provided that the executive committee would agree that full minutes of their meeting should be forwarded to him, and that, in the event of his disagreeing with any decision, the matter should be re-discussed at a meeting at which he should be present. In these circumstances it would, undoubtedly, be necessary for the vice-chairmen to take more responsibility than they have hitherto, and probably some arrangement might be come to by which a vice-chairman should be appointed as a responsible head of the club in each week. There might be four vice-chairmen, each taking a week in each month.

A contemporary of yours has, I see, suggested that the late secretary, Mr. Claude Johnson, should take the place of Mr. Roger Wallace. Mr. Johnson, however, stoutly declines; in fact, he has already refused a pressing invitation from the existing club committee to join their body, on the ground that he would never consent to take a place in which he might be called upon to closely criticise the work of his successors.

I am sure everyone will regret that members of the club may find it necessary to omit to vote in favour of some old and valued supporters of the club. The club must, however, be the first consideration of every member, as some of the present gentlemen are largely responsible for a policy which is not only undignified, but disastrous; it is the duty of members not to include them in their new committee. There are others who have not been able from various reasons to attend committees except at rare intervals. *It must, therefore, be clearly understood that this is a matter of policy, not persons.*

In conclusion, I must add that in most cases I understand that the gentlemen whose names I have suggested will act, but for the good of the club it is to be hoped that those who have not been previously approached will also see their way to officiate if elected.

AN OLD MEMBER.

Mr. MARTIN J. TUCHMANN has been gazetted Lieutenant of the Motor Volunteer Corps.

MR. RUDYARD KIPLING'S amusing verses continue to appear. Perhaps his imitation of Lord Byron in the style of his least successful stanzas in "Don Juan" is not altogether happy, but his parody of Wordsworth's, "She Dwelt beside Untrodden Ways," to which he has transferred the title of "The Idiot Boy," is simply delightful. The horrible bathos of the line with which the former poem ends—"Oh, the difference to me!"—has been seized upon by Mr. Kipling, and very appropriately converted into "Oh, the differential gear," referring, of course, to that important part of the mechanism of the car on which "The Idiot Boy" has exercised his talents.

BRITISH AUTOMOBILE INDUSTRY, 1904.

(By T. C. Aveling, A.M.I.C.E.)

AT the outset Mr. Aveling pointed out that it was surprising to find in how few hands the actual making of automobiles by British firms remained. They were, however, all interested in the advancement of a sane and sanitary method for the propulsion of road vehicles. He thought that it would be from the useful or commercial vehicle that the industry would eventually obtain its firm basis and establishment. At present in many quarters the automobile appeared but an instrument to our sporting proclivities, ranking with a steam or sailing yacht. That this popular view was losing ground was instanced by many railway companies taking up the mechanical vehicle, that members of the medical profession found the petrol car for travelling more efficient than any other, and that the trials by the club of commercial vehicles this year were being awaited with great interest by the big carrying firms of the country. He pointed out the vital importance of transport facilities by means of the automobile by mentioning the case of St. Bartholomew's Hospital, who were asking £500,000 for a rebuilding scheme. The present site on which the hospital stood was of the estimated value of 1½ million sterling. He thought that a site at a smaller price in a more densely populated district should be secured which would be of greater value to suffering patients, and it should be possible to place about London surgeries and depôts occupied by medical men and nurses, and connected to the main hospital, re-erected on a cheaper site, by high-speed automobile ambulances. Such a scheme would save the public some hundreds of thousands of pounds by means of the use of the automobile.

Up to the present the leading firms had confined the greater part of their ability to the production of pleasure vehicles. The future of the industry would, he thought, eventually and permanently be with the commercial vehicle. The natural idea of the Britisher was that first cost was the whole thing and the only thing, forgetting that cheapness of upkeep and of running expenses was of much greater importance. This view was one of the vital reasons why the automobile movement had been so slow in this country. This position was gradually altering, and a certain number of the members of the industry were making endeavours to be ready to meet the demand that must surely come. Nevertheless, strides in the last four years in the output of the majority of firms had increased. The figures for that period for some of the leading makers were as follows:—

	Value of cars per week.	
	1900–1.	1903–4.
	£	£
Wolseley, estimated	500	2,500
Daimler ,,	1,400	4,500
M.M.C. ,,	1,000	2,000
Manchester ,,	None	3,000
Ariel ,,	150	1,000
Napier ,,	600	6,500

These figures showed something like 400 per cent. increase in three years. Since then a number of firms had been formed, and were carrying on manufacturing work. The industry spread itself over so great an area that it was necessary to apportion to each firm its own work to sub-divide it under its various headings. He, therefore, divided the industry firstly into four heads, viz., heavy vehicles, from 3 tons and upwards; light vehicles for goods and passengers, up to 3 tons; accessories, and petrol launches. The first of these he sub-divided into vehicles propelled by steam, petrol, petrol-electric, and oil (heavy). These were again sub-divided, the first, steam, into wagons and light road locomotives.

He desired to draw the attention of makers of heavy lorries to the seriousness of supplying a lorry with a too narrow wheel width, so as to do as little damage to the roads as possible. County authorities were becoming more and more severe on the motor vehicles, and were to a great extent inclined to treat any self-propelled vehicle as the scapegoat for any extraordinary wear and tear on the roads, unfortunate owners being made to pay not only for their own damage but for the greater part of the wear and tear of the ordinary traffic. Some authorities would tell you that it is not the broad locomotive wheel with its diagonal plates that does the harm, but the incessant hammering of the small and narrow-faced wheel. It would be an excellent thing if the law as to the smooth-tyred wheel were altered, and in its stead diagonal plates allowed so long as they were of a close formation, and a minimum width of tyre enforced in proportion to the total weight moved. In heavy vehicles using oil as fuel, in addition to Messrs. Hornsby, who had carried off last year the War Office prize, the Wolseley Company and the Thornycroft Company had both in hand lighter oil-driven vehicles suitable for the requirements of the War Office.

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* Excerpt from a Paper read at the Automobile Club on February 11th.

Light vehicles for goods and passengers up to 2 tons he subdivided into three divisions, viz., commercial vehicles for goods, 2 tons; pleasure cars and railway coaches.

Coming to electric vehicles, Mr. Aveling gave a few details of the chassis and methods of working of the City and Surburban Electric Company.

In regard to railway coaches, he reminded them that the railway companies had not experimented before in this direction was a matter of considerable surprise. He however found that in 1846 the Great Eastern Railway carried out some trials with a Samuel's engine and an Adams combined engine.

Dealing with petrol launches and engines which sub-divided itself into two departments, viz., engines and hulls, he drew attention to the extraordinary speeds obtained by these vessels, and said that Messrs. Thornycrofts were the only people who designed and made both engines and hulls. He understood that Messrs. Yarrows, in conjunction with Mr. Edge, were making extensive experiments for designing and building hulls for the Napier engines.

Coming to accessories, this sub-divided itself under the headings of body buildings, axles, wheels, frames, lamps, tyres, clothing, fittings and accumulators.

He estimated that about three-quarters of a million was paid annually in wages in the industry at the present time, this supporting and giving a livelihood to in all some 40,000 persons. At present there was in hand about £840,000 worth of work exclusive of tyres, which would probably be delivered within the next six months, and the total output capability of the firms now in the industry was close on £2,000,000 worth of work, of which £1,500,000 might be detailed to light vehicles alone. The imports last year into the country had been £2,000,000. He had no hesitation in stating that the demand for cars would increase, and that we should be able to supply the demand as it grew.

In reference to racing he considered improvements in design and manufacture could only be made by the competition of cars and different manufactures. He thought that motor car racing was the sole and only reason for our neighbours being so far ahead of us in the perfecting of these machines. It was impossible to improve motor vehicles unless we experimented with them right up to the breaking point. By racing we were enabled to do this and accurately improve the construction in every minutest detail. Mr. Edge, who was building up for himself an international reputation, had thoroughly realised this from the first outset. He urged upon each member of the industry to have a representative, preferably a designer, attend all the leading races abroad this year, and to carefully note particulars at the weighing, and minutely examine, if possible, the successful cars after the race. The experience so gained would be invaluable.

Dealing with the future of the light car he thought it would be advisable for makers to understate the capabilities of their vehicles than to overstate them. The wish for a stronger car was absolutely ingrained in the nature of the motor car user, and from a light car he would proceed to a larger one. Therefore the builder of a good light car could certainly look forward to an increase of orders for larger cars in two or three years' time, should this light car have fulfilled all the qualities that he gave it credit for. Moreover this was a proper and right manner of teaching a nation the use of the automobile. Most of the accidents in racing had been due to placing novices and untrained drivers at the steerage wheel.

He looked forward to roads becoming in time dustless. In the late sixties, the suggestion of rolled roads by means of the steam roller was looked upon as a hairbrained scheme. It would, therefore, not be too idealistic to impress upon the authorities the absolute necessity of the dustless road, and he had no hesitation in predicting that in ten years' time there would be no dust on the common main roads in this country.

He then drew attention to the importance of a school for drivers, particularly mentioning the Battersea Technical School where a course for drivers had been instituted through the invaluable help given by Lieut.-Col. Mark Maybew and Sir George Newnes. He thought it would be well for all our public authorities to realize that every facility should be given to promote the individual to gain all the mechanical and technical knowledge necessary to be a thorough master of his work, considering that automobilism could be looked upon as one of the important industries of the future. Consideration for the safety of the public also rendered it important. He thought it was possible for each and every member of the industry to suggest to the technical education authorities in his own town the importance of commencing a class with this object.

In conclusion he drew attention to the great importance of the work the industry was carrying out. He asked, are we cognisant of the fact that the automobile not only practically revolutionises our methods of commercial transport, but that also, ideally, it brings into our lives a new pleasure? The other day he took a deaf and dumb friend for a ride for the first timé on a small car. His friend entered the car with a dull, inert, and hopeless expression; after the run, and when he had landed him at his door, the expression on his face had entirely altered—a new light was in his eye—he looked as if he felt that after all there was some pleasure left in his life.

He therefore begged his audience to take the highest possible view of their work—in itself a revolution and destined to make better and bring hope of better things to mankind at large. Let them infuse into this industry the knowledge that they were doing good work beyond the accurate setting of gears and wheels, and also let it be known that this industry brought a new hope of happiness and higher employment to the whole of human kind.

MOTOR TRAFFIC DEVELOPMENT AND ITS CONNECTION WITH COMMERCE.*

By the Hon. C. S. Rolls, M.A.

MR. ROLLS, in opening his admirable paper, gave a glance back into the history of mechanical road locomotion, detailing the experiments during the last quarter of the eighteenth and the first quarter of the nineteenth century, referring to the first self-moving vehicle by Cugnot, and tracing the evolution of the mechanical vehicle down to the present time. He stated that there were now at least 116 makers of motor cars in Great Britain. France, by their early start, led the way in pleasure vehicles, to which they had practically confined their attention almost entirely. England, however, had produced the most successful and greatest number of commercial vehicles for heavy haulage in the world. He divided his remarks under four headings, viz., the light pleasure car, passenger vehicles for public service, the tradesman's delivery van, and the heavy goods lorry. In the first class he included vehicles weighing up to 25 cwt., and he thought that very soon there would be scarcely a country mansion without a motor car. He thought that the problem of a really good little car, giving a speed of twenty to twenty-five miles per hour, simple in construction, easy to learn, and cheap to maintain, and sold at the price of about £100, would be solved in a very short time. In regard to passenger vehicles, he considered it was only a matter of time before motor omnibuses became universal and ousted the horse-drawn vehicle. From the humane point of view, this should be welcomed by the whole of the community. The introduction of the tramways for convenience of passenger transit was practically turning our streets into railroads, making confusion worst confounded. With motor vehicles the need for the tram system would vanish, and passenger traffic be more quickly and more efficiently dealt with, added to which there would be only one-sixth of the capital expenditure, with corresponding benefits to the ratepayers. The light tradesman's delivery van to carry from 5 cwt. to 30 cwt. of goods had an enormous future, he thought, before it; far greater than the pleasure vehicle. He regretted the experiments of certain enterprising business houses, who had purchased light petrol-driven vans, and which had not proved altogether satisfactory. He thought the cause of the trouble was clear. The suppliers of this type of van had utilised one of their standard frames designed to carry a 4 or 6-seated body and simply fitted a van on to it to carry 15 or 20 cwt., with the natural result that sooner or later under the extra strain the bearings, suspension or transmission gear gave trouble. These facts did not, however, detract from the inherent advantages derivable from an economical, reliable and properly-designed motor van. In dealing with the heavy goods lorries, he looked forward to enormous developments in the near future, and he considered that the railway companies would be among the first to benefit very largely. Their usefulness as feeders to the main arteries would also become appreciated, and farmers, by being able to send their produce direct to markets 40 or 50 miles distant and avoid intermediate handling, at less cost than at present, would lead to enormous developments in this direction. Five years ago there were less than 20 motor wagons, to-day there were about 1,000 in this country. Mr. Rolls then gave some extremely interesting figures of the results obtained by various commercial firms in Great Britain. He had selected a few typical cases. First a firm of London brewers, delivering 70 barrels per day, involving a 7 miles' run. Cost by motor, £2 6s. 11d. against the Company's own teams, £3 10s., or hired teams, £4 9s. 4d.

A firm of Birmingham brewers had compiled results showing six months' and twenty-eight months' working by motor and by horses. By motor the total cost was £1,086, against a pair-horse dray, £613. The motor, however, carried 2,837 tons against 2,636 by horse, and covered 5,384 miles against 2,247 by horses. These figures would therefore show £494 in favour of the motor lurry. The conclusion that this firm had come to after the twenty-eight months' experience was that £200 per annum is a fair estimate of the advantages of the motor lorry over horse drays.

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*Excerpt from a lecture given before the London Chamber of Commerce on February 9th.

Another brewery with a steam lurry covered 2,730 miles at a cost, including all outgoings and depreciation, of 3¼*d.* to 3½*d.* per ton mile, which they said showed a saving of 50 per cent. over horse haulage and 33 per cent. over railway rates.

A firm of millers, who moved daily over 30 tons to and from the docks, found that carting by motor cost £5 10*s.* per week and £10 4*s.* 2*s.* per week by horse.

A number of other examples, he said, could be given, but he had chosen these as being authentic figures carefully compiled by men of business anxious to ascertain what advantages or otherwise were derived for the substitution of mechanical for horse traction.

To put the matter in a nutshell, it might be said that a motor lorry should succeed where its mileage is not less than 175 per week, with an average load throughout of 3 tons, or a combined ton mileage of approximately 500, and at an average rate of not less than 4½d. per ton mile, including collection and delivery. The cost of working a 4-ton lurry inclusive of interest, depreciation, fuel, repairs, wages, &c., for a daily run of 40 miles for 5 days per week with a short run on Saturday, should be about 24*s.* per week. Running light (*i.e.*, returning empty) should be avoided as much as possible, if even by combination with another trader. A 4-ton lurry would probably not pay in town work with average deliveries of less than 3 cwt. a call, say 27 calls per day.

The biggest field for the motor lurry—between the limits of economical horse haulage, say 10 miles, and the minimum distance of economical railway transport, *i.e.*, where the terminal charges bore a high ratio to the conveyance charges—say 40 miles.

He thought the motor wagon for heavy haulage had now arrived at a thoroughly practical commercial stage, a large proportion of the vehicles now being built being repeat orders. He thought that the substitution of mechanical for horse transport would benefit the whole of the community in many ways, chiefly in the direction of national prosperity, social and commercial convenience, and economy. In the great cities it would be of special benefit, and would result in an improvement of the condition of the streets and of traffic generally.

Mr. Rolls concluded his lecture by showing a few comic pictures, prophecies of the future, &c., from drawings by Rowlandson, Cruikshank, and others.

THE QUARTERLY 100 MILES TRIALS.

The quarterly 100 miles non-stop trial of the A.C.G.B.I. was held on February 12th. The route was the usual one towards Oxford and back. The road was very bad, up in parts, and recovering from floods. The weather was fair for first forty miles, very bad afterwards, and the wind on the outward journey strong behind car; a very strong head wind running on the return journey.

The only car entered was the 2-seated single-cylinder 5-h.p. **Coventry-Humberette,** fitted with electric ignition; weight without passengers, 8 cwt. 1 qr. 20 lbs., with two passengers, 11 cwt. 1 qr. 26 lbs. Fuel used, 2 gals. 3 qts. 1 pt. 14 oz.; water, 1 gal. 2 qts. 5 pts. Average cost of fuel per mile at 1*s.* 3*d.* per gallon, ·44*d.* Speed, outward journey, 13·82 m.p.h.; return journey, 12·09 m.p.h.

Hill-climbing speeds:—

(*a*) The steep portion of Dashwood Hill—Time to danger board, 4 mins. 10 secs. = 9·65 m.p.h.

(*b*) One mile, including Dashwood Hill—Time for the mile, 5 mins. 20 secs. = 11·25 m.p.h.

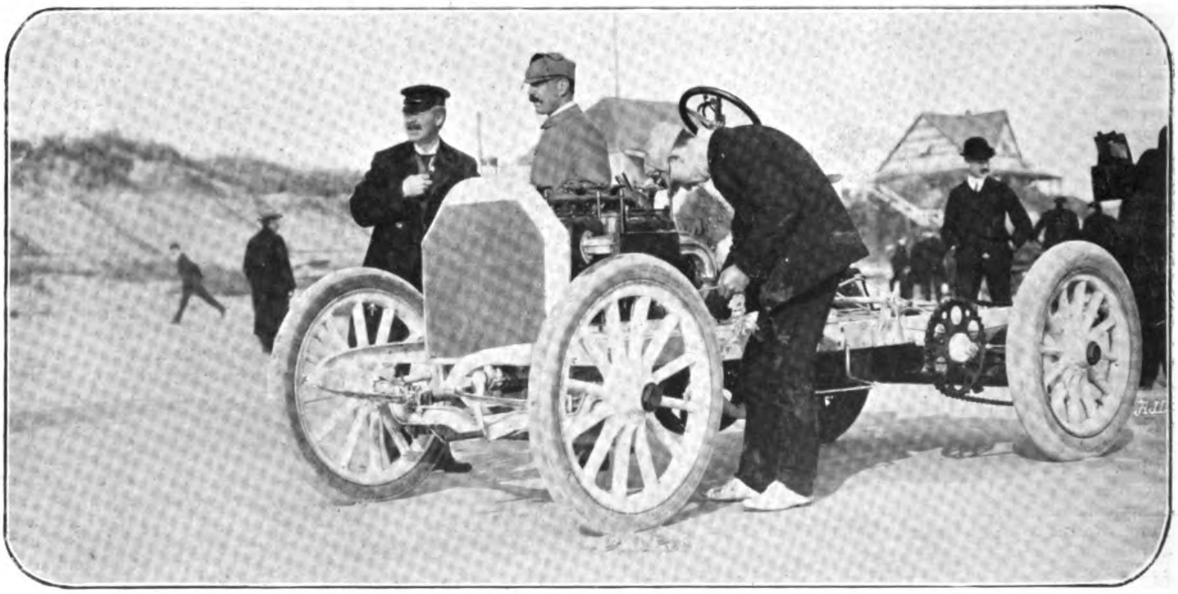
(*c*) Aston Hill—Took two passengers all the way up in 15 mins. 10 secs. = 6·42 m.p.h.

GORDON-BENNETT ITEMS.

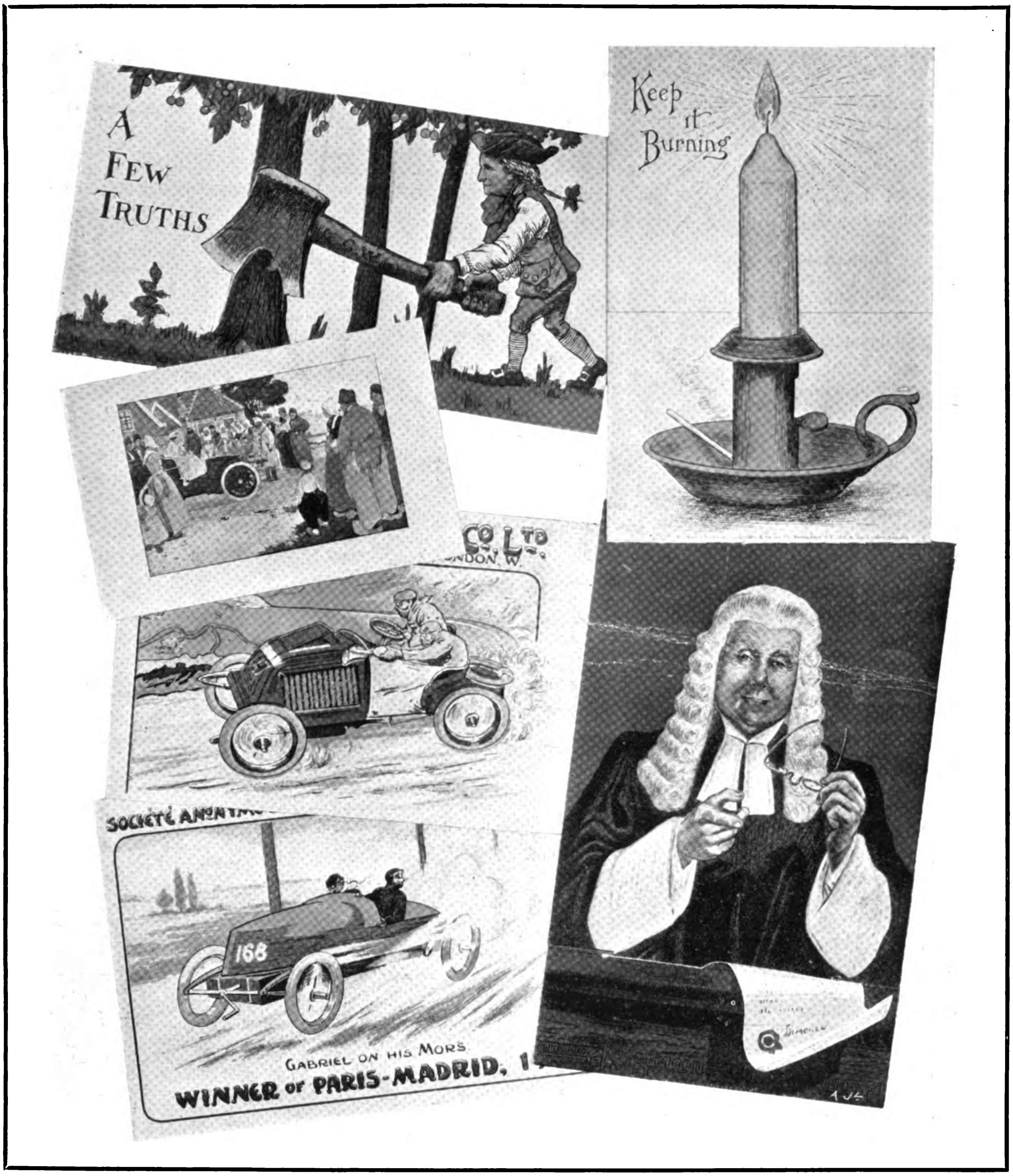
Yellow and black, the national colours of Austria, have been selected by the A.C. of Austria for the colour of their cars.

Comte de Vogüé, in the absence of Baron de Zuylen, is officially approaching the French Government for permission to hold the French eliminating trials on the new Argonne Circuit. He has the support of the whole of officialdom of the district, and is backed up with a petition, asking for the permit, bearing 20,000 signatures.

Messrs. Smith and Mabley, of New York, are reported, from America, to have entered a motor boat for the British International Cup.



ORMOND-DAYTONA BEACH RACES.—Photographs are now to hand in connection with this meeting on the Californian Beach at which such remarkable record times have been made, and of which we have given in previous issues full particulars. In addition to the interesting photographs on our front page, Mr. H. L. Bowden is shown above just before his start for the 15 miles race. He is reported to have covered this distance in 10 mins. 18 secs. on his 60-h.p. Mercedes Car. Mr. Bowden in a canvas jacket is standing in the centre of the picture talking to Mr. J. F. Hathaway. The particulars of this meeting appeared in our issue of February 6th.



Considerable ingenuity is shown in the forms of advertising at the Crystal Palace Show this year. We reproduce a few specimens in this direction selected haphazard from amongst the exhibitors' attractive "literature." The originals are considerably more attractive than would appear from our black and white reproductions, as they are without exception all produced in colours. The two top pictures are circulars issued by the United Motor Industries, the left-hand one being "a few truths," after George Washington and his little hatchet style, in respect to a speciality of this firm, whilst the picture to the right, "Keep it Burning," refers to a special make of acetyloid lamp of the same Company. The little Flemish picture is a reproduction of the Germain Company's well-known poster, the two pictures immediately under this being productions of the Roadway Autocar Company, in connection with their Renault and Mors cars. "A Good Judge," on the right, is one of many circulars of Messrs. Charles Jarrott and Letts, Limited. This particular circular sets forth the merits of the little Oldsmobile Car as from "a good judge, an honest judge, an unprejudiced judge, a capable judge, and any kind of judge."

THE race for the Coupe Sneyden in Algeria has been, for the third time, postponed, on this occasion until to-morrow, the 21st instant.

A GOLD medal, of last year's type, has been awarded to Mr. S. F. Edge as a memento of his winning the Harmsworth Cup at Queenstown last year.

THE original dates arranged for the Spa Automobile Fêtes have now been altered, starting from July 27th and ending August 5th. In the event of the Eliminating Tests for the Gordon Bennett Race being run off in France, they will immediately follow the Belgian Ardennes Circuit, which would then be fixed for July 25th. An exhibition of automobiles will be held from July 30th to August 3rd, and all space will be offered gratis to the exhibitors.

IN connection with the Milan-Nice Motor Bicycle Contest, which we recently reported, the prizes have been allotted as follows: Peugeot, endurance prize; Zedel, for the most smoothly-working machine; and Türckheimer, for the light machine class. Gold Medals are also awarded to Adler, Stucchi, Wanderer, Motosacoche, and Dei. In the Wagons section, the Daimler takes the Minister of War's prize, and the Fiat wagon the prize offered by Chevalier Massoni.

THE end of April has been definitely fixed for the Tourist Motor Bicycle Endurance Test being organised by the Auto Cycle Club of France, when the route will be from Paris to Bordeaux and back, run off in four stages, both the outward and the return journey being broken at Tours. The third day will be devoted to an exhibition of the competing machines at Bordeaux. This international contest is unique as it is confined exclusively to actual constructors of motor bicycles.

THE May Day Automobile Parade of trade motor vehicles is to be repeated this year, when a number of prizes for the best kept vehicles will probably be forthcoming.

BY an obvious clerical error the wheel-base of the petrol inspection trolley, which was described on Feb. 6th (page 147), was wrongly given, being, of course, 5 ft. instead of 15 ft.

THE motor car has again been in forcible evidence at election time. As many as 100 motor cars were employed at the recent election at the St. Albans Division of Hertfordshire, contributing, we understand, very largely to the result of the poll.

AN Exhibition of Arts and Industries is to be held at Trent Bridge, Nottingham, from May 14th to October 8th. A special section for sports and pastimes, including automobilism, will be staged from the opening of the Exhibition until June 11th.

THE Bolton Corporation are establishing a motor omnibus service from that city to the village of Darcy Lever. Other Lancashire Corporations are watching the experiment with the intention of running similar vehicles if the trials prove successful.

THERE really seems no limit to what a policeman will assert when in the witness box and inspired by the hope of obtaining a conviction. No one will ever quite forget the two police constables of Highgate who asserted on oath that they were able to run 40 and 60 miles an hour respectively; and these athletes will probably hail as a brother expert in "evidence" the intelligent superintendent of police who declared in a case in which a traction engine was summoned for exceeding its legal speed of four miles an hour, that "it went by like a flash, your Worship." Fortunately the traction engine being mainly constructed of metal was not likely to become dangerously heated by the friction of the atmosphere.

AT the half-yearly meeting of the London Road Car Company, the chairman made the gratifying announcement that the directors were doing everything possible in regard to adopting mechanical vehicles, and he thought that in a short time they would have one or two on the road. He had great faith in these vehicles, believing that they would be the trump card for omnibuses when the proper car was found. They would easily beat the tramways, which ran on fixed rails with an expensive system of electric traction. We understand that the London Road Car Company have already placed an order for two standard "Chelmsford" chassis for the purpose of testing them thoroughly on the London streets. The Company will construct the body portion of the omnibus at their own carriage works.

IT is equally encouraging to know officially from Earl Cawdor, the chairman of the Great Western Railway Company, that the motor car services which this Company have during the last year been running in connection with their outlying stations have proved a very great success, and an enormous convenience to the public. The directors have in this matter moved very carefully, but they are now completely satisfied with what has been accomplished, and, as we announced some little time back, have ordered a number of additional motor cars for immediate use.

The Goat: By George! This fellow butts almost as hard as my brother Bill used to when he was in his prime.
—*Motor*, U.S.A.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

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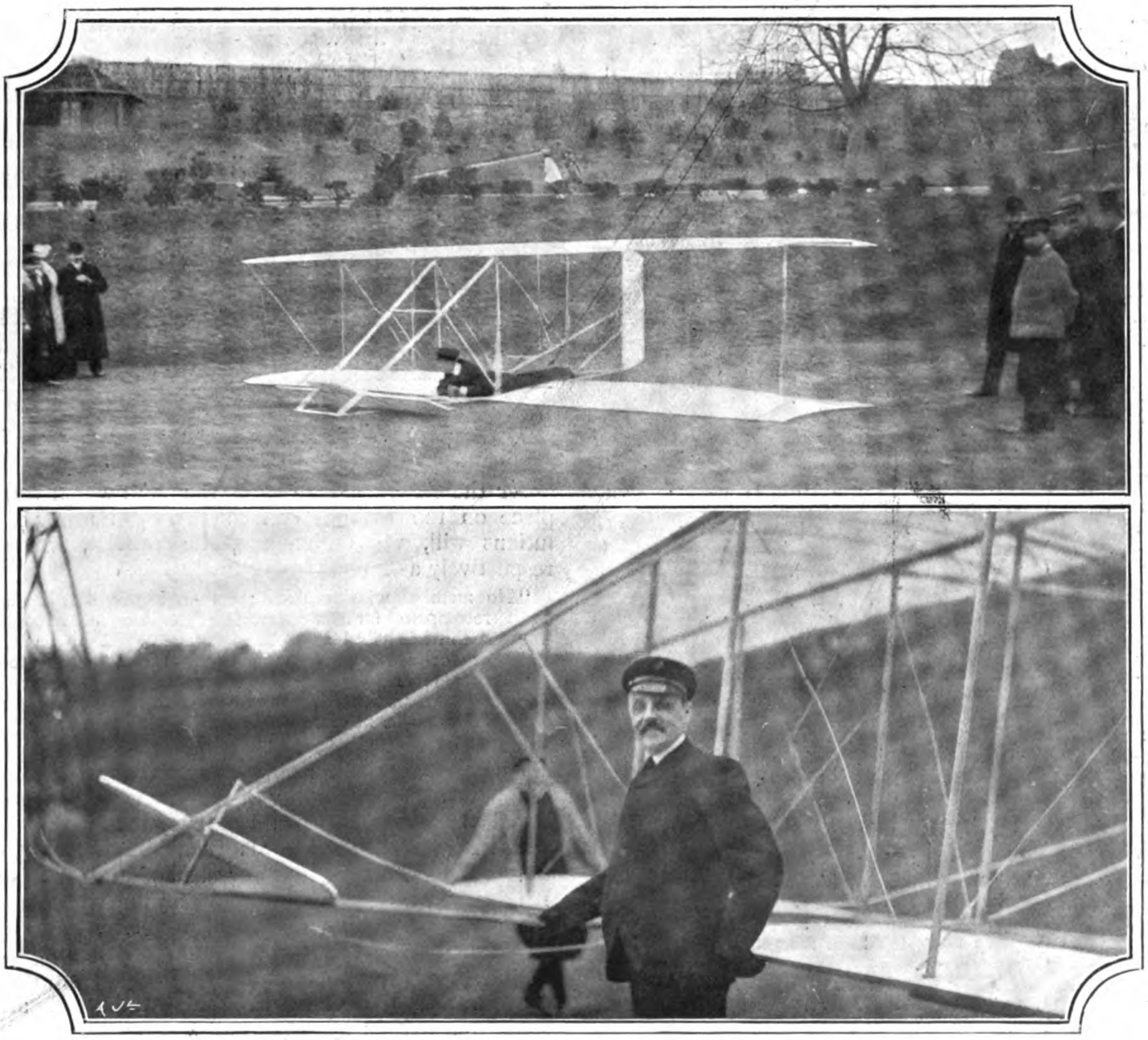

M. Archdeacon, the well-known French automobilist, has had, as our readers are aware, a "gliding" aeroplane built for him, on the pattern of the Wright machine, at the aeronautical works at Chalais-Meudon. In the lower illustration he is seen standing in front of his machine, while above the aeroplane is shown on the ground in the position in which it should conclude a successful glide. We give a description of the apparatus in this issue of the "Journal."

THE AUTOMOTOR JOURNAL.

SUBSCRIPTION RATES.

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12 „ „ ...	14	0	12 „ „ ...	18	0

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Mar. 4 ...	"Some Practical Notes on Electric Storage Batteries," by G. C. Allingham (Junior Institute of Engineers).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 10 ..	Automobile Club General Meeting.
Mar. 15 ...	"Cost, Up-keep, and Care of an Autocar," by Messrs. J. Adam and J. H. Steen (Scottish A.C.).
*Mar. 17 ...	"Valves and Valve Mechanism of Internal Combustion Engines," by Mr. R. E. Phillips, M.I.M.E. (A.C. Paper).
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24 ...	Smoking Concert.
Mar. 25–30 ...	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May ...	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
August ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Feb. 29–Mar. 5	Cleveland Show.
Mar.	Paris-Rome (*La France Automobile*).
Mar. 3, 4, 5 ..	Fuel Consumption Trials (*L'Auto*).
Mar. 6–12 ...	Buffalo Show.
Mar. 13–20 ...	Cannes Automobile Week.
Mar. 14–19 ...	Boston Show.
Mar. 15–16 ...	A.C. America Commercial Vehicle Trials.
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan Motor Boats).
Apl. 18–23 ...	Paris-Nice-Rome.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 1–12 ...	A.C. Bordelais Automobile Fortnight.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11 ..	Paris-Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

Two Important Resolutions.

AT the General Meeting of the club which will take place on the 10th of next month, two important resolutions will, we understand, be moved, which are respectively as follows:—

> "No member who receives remuneration, grant, or financial recompense for services rendered to the club or in connection with trials held by the club, shall be eligible to be president or vice-president, a chairman or vice-chairman of the club."
>
> "The name or patronage of the club shall not be given to any Society, Institution, Association, Exhibition, or Show without the consent of two-thirds of the club committee given in writing."

To neither of these resolutions can any objection be raised, though the wording of the first is perhaps open to criticism. It would probably convey the meaning of the framers better if to the words "shall be eligible to be" were added the expression "or shall continue to remain." If passed in this form it will have an important effect in tending to maintain the club atmosphere, and particularly the atmosphere of the committee room, in a state of purity. As pointed out by its proposers, in the principal automobile clubs of the world, and all the leading scientific societies—to which they might have added all the clubs of any importance in the Kingdom—the leading officers invariably give their service and frequently perform very arduous duties gratuitously. It is not calculated to do the club any good in the eyes of the outside public if the idea gain prevalence that those at the head of its affairs are performing their duties in the hope that at the end of a year or two a substantial sum may be voted to them in recognition of those services. If the same principle were to be extended to members of the committee it would also, in our opinion, be of considerable advantage.

The second resolution is not less important. Should it be passed, as we sincerely trust it will be, it will render it impossible for any small committee in the future, even if so disposed, to bring the club into the position which it has recently been reluctantly compelled to assume, of appearing to bestow its favours and patronage on one of two great rival undertakings for a pecuniary consideration.

Should someone in the meantime see his way to proposing and securing the necessary support for a resolution that the powers of the executive committee in future should be generally more circumscribed, and that it should on vital questions be compelled, and not merely permitted, to take the opinion of the general committee, while the general committee itself, on vital questions, should be obliged to call a general meeting of the club, we feel sure that such proposals would be probably carried, and would have a most beneficial result upon the manner in which the affairs of the club are in future conducted.

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The Voting for the Club Committee.

THE present is a critical moment in the history of the Automobile Club, and to a certain extent, therefore, in the history of the automobile movement. The members of the club have an opportunity of revising entirely the present committee. We have frequently had occasion to point out that the policy to which, by the action of the existing committee, the club has been committed during the last few months, has resulted in a serious diminution of the dignity and prestige of the club, with the consequence that a body which at one time enjoyed the confidence of automobilists generally, the respect of the public, and a friendly recognition from the Government of the country and all important administrative authorities, has been brought into a position in which it has forfeited the confidence of those whose interests it should support, has ceased to be looked upon by administrative authorities as a body with whom it is worth while to treat, and has come to be regarded by the general public with a half humorous feeling of concern. We need not recapitulate the counts of our indictment. Practically, the whole of the automobile press has repeated them, and Members of Parliament and Ministers at public functions, such as the opening of the great Automobile Show at the Crystal Palace, have publicly endorsed the criticisms which we have made. It is sufficient at present to recall the three principal blunders which they have committed, viz., the manner in which it estranged the Parliamentary automobile party last August—the ill-advised circular directed to local authorities in reference to the registration of cars which irritated bodies rapidly becoming neutral, if not positively friendly to automobilism, and the action in regard to the bestowal of the club's patronage on one of two rival exhibitions for a monetary consideration, which has called forth such a positive storm of protest both in the automobile press and from individual automobilists. No one can entertain a doubt that if the management of the club and the conduct of its policy is to be continued on the lines which have been adopted during the last few months, the general position of the Automobile Club will go from bad to worse, and it will forfeit the last vestiges of consideration which it still preserves.

Under these circumstances, if the members of that body who have its welfare at heart desire to see a reversal of the recent mistaken policy, their course is clear. They should elect a committee which will restore the confidence so much needed at the present juncture. Only in this way can the club be really saved, for if some extensive change in the committee is not made we shall have the old mistakes, the old want of diplomacy, the old short-sightedness over again, probably in an exaggerated form. For those controlling the executive committee will feel that by being re-elected they have obtained a new lease of life, and that their past mistakes and blunders have been condoned. And a continuation of this sort of thing will mean either the destruction of the club or its annihilation as a guiding and a controlling force in the automobile movement.

No automobilist, least of all automobilists who are also members of the club, can view this result with indifference, particularly when they consider the great services which the club has rendered to the movement in the past.

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Energy Needed.

BUT a certain amount of energy, or, at any rate, interest, on the part of the members of the club will be needed to effect the much-required reform. We would urge every member of the Automobile Club on the present occasion to record his vote, and to record it on behalf of the new members proposed for the reform committee, many of whose names were in the list put forward by "An Old Member," a revision of which we shall print in full next week. There is no particular hurry about returning the voting papers. They will be received probably early next week, and it is sufficient if they are posted to the club on Tuesday, the 9th of March, or delivered on Wednesday, the 10th. They can even be handed in during the first half hour of the general meeting of the club.

The present occasion is a critical one. No member of the club will be doing his duty either to that institution or to the automobile movement, who does not record his vote. Only by the election of a completely revised committee can we hope for a reversal of the disastrous policy of the immediate past, and unless such a reversal takes place the club will certainly not continue for very much longer to enjoy even the amount of consideration which remains to it, and this would without any question be a serious disadvantage to the industry.

On the other hand, should the members, whose names are proposed, be elected to the new committee, there is every reason to believe that the club will very rapidly regain the prestige and consideration which it for so long enjoyed, and then we shall once more have a powerful body which will command the confidence of everyone interested in the new movement, will be regarded with respect by the general public, and can again, as in the past, act effectively as an intermediary between the movement and legislative bodies and the public on one side and the automobile world on the other.

In the event of the above committee being elected, not only will the Duke of Sutherland, as we have already announced, be willing to accept the presidency, but the Earl of Dudley, the present Lord Lieutenant of Ireland, has intimated his willingness to act as one of the vice-presidents. It has been proposed by Mr. Scott Montagu that, in addition to the club committee, there should be constituted a supreme council of the club, which would act as a sort of court of appeal in all serious matters, and should consist of the president, the three vice-presidents, the chairman of the club committee, and the three vice-chairmen of the club committee. This would form a body of eight men absolutely free from bias, and would obviate the possibility of the general policy of the club being in future run as it has been in the immediate past by a small group of the executive committee.

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Confusing the Issues.

IN our correspondence column will be found a letter from the Earl of Shrewsbury more or less on the same subject. We put it in just as it was sent to us, though it is obvious that it must have been sent out in a great hurry, and would have been the better for a little "editing," as in one place, at any rate, it fails to make sense, though the general drift is apparent. To Lord Shrewsbury's letter is appended a reply by Mr. Roger Wallace, of which we shall have something to say presently.

Lord Shrewsbury takes the lofty and self-denying ground (for he is himself a trader), that no members of the trade or automobile journalists shall be eligible for the committee, and that the club committee shall be empowered to appoint sub-committees, and these principles he embodies in two correspondingly worded resolutions.

Why Lord Shrewsbury has put forward his second resolution it is decidedly difficult to understand, and does not suggest very minute acquaintance with the affairs of the club on his lordship's part, for the club committee has always possessed the power of appointing sub-committees from its members, and has made frequent use of it.

As regards the first point, we have little hesitation in saying that it is an obvious red herring drawn across the course of the existing controversy. The proposal appears as a spontaneous outburst on Lord Shrewsbury's part, and this impression is strengthened by Mr. Wallace's apparently artless reply. But in reality it is nothing of the kind. Mr. Wallace knew all about Lord Shrewsbury's proposal before he formally received it, and before he wrote his acknowledgment of it. For a *small* meeting was specially convened by Mr. Wallace, per telegram, to consider the proposal on the previous Wednesday, and it was not till after a plan of action had been agreed to at this meeting that the letter was written, and it is, as will be seen, dated the 19th, while Mr. Wallace alludes to it as Lord Shrewsbury's letter of the 18th—under the circumstance a significant error. The letter has, therefore, every appearance of having been arranged, and it was arranged after the campaign in favour of a new committee had been opened by "An Old Member" in the *Car*. We, therefore, feel perfectly convinced that the main object aimed at is to confuse the issues, and in that way impair the prospects of election of the new committee proposed by "An Old Member." And it attempts to do this by appropriating a portion of the suggestion put forward by Lord Stanley, at the Crystal Palace, that the A.C.G.B.I. should be assimilated to the Jockey Club.

Even if *bonâ fide*, this proposal would, at any rate at the present moment, be highly ill-advised. No accusation of partiality has ever been brought against the trade members of the committee. On the other hand, they have supported the club with their experience, advice, and what is even of greater importance, with solid cash on a generous scale. Without their support in these ways in the past the club would have been able to accomplish but a small portion of the good it has been able to effect. Even at the present moment, the club would be reduced almost to a nonentity without their support. A day may come when the trade members may cease to desire representation in the councils of the club, and when the club will be in a position to do without them, but most emphatically, it has not come yet.

There are other points in the letter which demand attention—and refutation. Lord Shrewsbury declares that it is the non-trade members of the committee who have been successful in preventing "any serious action against the general interests of automobilism" from being taken. As a matter of fact, it is just a certain section of those members who pose as not belonging to the trade who have been the cause of all the trouble.

In addition the statement is made that Mr. Scott-Montagu's proposed new committee (that is the new committee proposed by "An Old Member") contains a majority of trade members. As a matter of fact it contains the names of twenty trade members out of a total of fifty.

The letter, however, can hardly be regarded seriously, and considering the fact referred to above that the proposals it contains were previously discussed at a small, hurriedly-called meeting, it certainly appears distinctly disingenuous.

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Another Trap that Failed.

MOST automobilists will remember the articles and interviews which appeared recently in the daily Press concerning Sergeant Jarrett, who was described, with something of lingering fondness, as the "champion motor catcher." We fear he must abandon the title of champion, for though he continues to fix traps set with stop watches of doubtful accuracy, along the Ripley Road with as much assiduity as ever, the intended victims have escaped his clutches when brought up before the Bench. At least this has happened on two successive Saturdays. On the 13th, Mr. Percy Holt, of Surbiton, was haled by Sergeant Jarrett before the Guildford Bench and charged with covering 176 yards in 15 secs., which was at the rate of 24 miles an hour *precisely*. In this case, although another policeman, Pink, did his best to corroborate his Sergeant's evidence, the Bench dismissed the case. Sergeant Jarrett also suffered from a similar reverse before the Bench at Woking on Saturday last, when Mr. Sibley, of Richmond, was alleged to have covered the same measured distance in 14⅖ secs., working out at 25 miles an hour—no more and no less. These two failures, following on the collapse of Superintendent Marks at Kingston the previous week, will, we trust, go some way to encourage the drooping spirits of the innkeepers and others along the Ripley Road, who, as Mr. Firth pointed out when asking for costs for the defence in the latter case, have complained on many occasions of the injury that is being done to their trade by the continued police persecution of motor cars.

It was the first occasion on which Sergeant Jarrett was subjected to the cross-examination of Mr. Firth, and a very able cross-examination it was. It had the effect of causing Sergeant Jarrett to cut a poor figure indeed. The air of jaunty insolence with which he commenced to answer the questions put to him in cross-examination gradually evaporated, and it became only too evident that there was no question of accurate timing involved at all, but that all that was done was to go through a form of timing, and, knowing that the measured distance was the tenth of a mile, to produce a record which, when duly multiplied, would come out at something over 20 miles an hour. Before the passing of the new Act, all the vehicles passing over the measured distances of Jarrett's police traps invariably gave a speed of from 18 to 20 miles an hour. Now that the speed limit has been raised, by an amazing coincidence they appear all to work out at speeds of from 23 to 25 miles an hour, and it is distinctly astonishing that in the two cases to which we refer the calculated distance comes out so accurately — in the one case 25 miles and in the other 24. That the whole thing was a farce was rendered sufficiently evident by Jarrett's replies. He had taken a certain tree 176 yards from the point at which he stood as the starting point, and alleged that when the driver passed the point he started his stop-watch, but he could not apparently be made to see that under such circumstances it was of vital importance whether the car was in the middle of the road or on one of the two sides, while the extent to which he admitted inaccuracy in regard to the moment at which he took the time when the car passed what he was pleased to call "the winning post," excited amusement even on the Bench. The case was really won owing to the fact that Police-Constable Pink proved unable to corroborate in any way the evidence of Jarrett as regards the actual speed of the car, and Mr. Firth at once pointed out that to establish an excessive rate of speed the new Act required the evidence of two witnesses, and though the Bench would not commit themselves to a statement of opinion on that point, they dismissed the case, declaring that they were not satisfied with the accuracy of the timing.

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Some Reflections on the Case.

THE demeanour of Sergeant Jarrett throughout his cross-examination was one of studied impertinence, which took the usual form of an attempt to make a number of exceedingly second-rate jokes. When asked how he got his distance of 176 yards, he replied "In the road," and to the enquiry where his hand was in timing the car, he gave vent to the wondrous witticism that it was "on his arm." It throws a curious sidelight on the kind of encouragement to which Jarrett must have been accustomed from the Benches before whom his cases have usually been brought, and the manner in which the magistrates have been accustomed to treat automobilists, to find a common policeman looking upon himself as justified in treating a member of the learned professions, to say nothing of the Bench who were hearing the charge, to such displays of silly insolence.

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Chronographs at a Discount.

MR. FIRTH elicited in the cross-examination of Sergeant Jarrett that after the collapse of Superintendent Marks' case at Kingston, eleven out of the twelve stop-watches with which, at the expense of the ratepayers, the police constables of the district had been armed for the purpose of timing motor cars, had been submitted to Messrs. Smith & Sons, of the Strand, to be readjusted. It is a significant fact that though the Deputy Chief Constable, in the place where he was sitting at the solicitors' table, denied this statement, it was subsequently admitted by Jarrett in the witness box. It is also an amusing example of police tactics that the Chief Constable explained by letter to Messrs. Smith that though the eleven stop-watches were apparently defective, the twelfth was being retained to fight a case on, and invited them to attend in Court and defend the possibly somewhat doubtful reputation of this instrument.

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An Honest Witness.

POLICE-CONSTABLE PINK is an honest man. He gave his evidence with perfect straightforwardness, and it was largely owing to the fact that he refused to corroborate Jarrett's estimate of speed that the case was won for the defence. We trust all automobilists will keep an eye on the future of P.-C. Walter Pink. Those who saw the glance with which he was favoured after delivering his evidence by Sergeant Jarrett and others of his superiors there present, will not regard this advice as superfluous. We trust his future in the police force will be a pleasant and happy one, but we much doubt it. Automobilists should make it their business to see that he is not dismissed from it on some pretext or other at an early date. Such things have happened, and may happen again.

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Why No Costs?

IN all these cases the magistrates invariably refuse costs. But this was a particularly scandalous one. Here was a policeman taking out a summons which put the owner of a car to very considerable expense, besides losing practically the greater part of a day; while several members of the automobile and general Press attended on behalf of their respective papers and journals. Not only was the evidence of the prosecuting policeman himself extremely shaky, and his stop-watch defective, but under the new Act his summons was so framed that he could not possibly have obtained a conviction, and this is, at least, the third case of the kind. Considering, in addition, the injury done to local business by these continued persecutions and prosecutions, it is nothing short of scandalous in cases such as this, where the Bench feels called upon to stop the case without having even called a single witness for the defence, that they should not be compelled to award costs.

Our contemporary, the *Pall Mall Gazette*, rightly dilates upon the impropriety of regularly entrusting the same policeman with this class of business. It stands to reason, says our contemporary, that a man must become prejudiced in time, and ultimately come to the conclusion that he is employed to trap motorists and obtain their conviction rather than estimate speed fairly or check excesses when they occur. The *Pall Mall Gazette* draws the attention of Captain Sant, the Chief Constable of Surrey, to the matter. Something more, we fear, is wanted than this. There ought to be some method of preventing what is really an administrative abuse in the police force.

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IT has been resolved by the executive committee of the Automobile Club that the word "Chauffeur" should not be used generally, but that the word "Motor-man" should be adopted in its place, and that the word "garage" should also be dropped, and the term "motor-house" adopted instead.

The annual general meeting of the Automobile Club will not be held at the Club-house, but in some public room, which will be taken specially for the occasion.

THE CRYSTAL PALACE EXHIBITION.

DURING the whole time the Exhibition has been open, and until its close on Wednesday last, the attendance of the general public has been all that could be desired. From a business point of view, the Show is generally regarded as having been a success by the exhibitors, many of whom claim to have done extremely well, and to have well filled their order books. Even the interest taken by the non-buying public has been remarkable, as evidenced by the evening attendances and by the throngs who have been present each Saturday. Taking everything into consideration, the weather, too, has on the whole been propitious, and the grounds and the immediate neighbourhood have, for the most part, presented a very animated appearance during the daytime.

In our report of the Show last week, we pointed out the various directions in which development has proceeded during the past twelve months, as demonstrated by the exhibits, and we emphasised the fact that very substantial progress has been made during that period, not only in other countries, but especially in Great Britain. Continuing to generalise, before describing any of the more interesting exhibits specifically, we propose to call attention to certain further characteristics which have been prominent at the Show.

Amongst the latest petrol engines there were a few having a shorter stroke in relationship to the bore than formerly—lines which we believe that the Ariel Company were amongst the first to adopt. In this connection special mention should be made of the Standard Company's vehicles, the two-cylinder engine which has a bore of 5 ins. and a stroke of 3 ins. The six-cylinder Maudslay engine, too, is another case in point, the cylinders having a bore of 5 ins. and a stroke of 3½ ins.

Although there have been a few petrol vehicles having engines working on the two-stroke cycle, yet we did not notice any of these in the Show, although quite a number of engines working on this principle were exhibited in the Marine Section for launches, most of them of Canadian or of American origin. About the only really novel engine in which radical departure has been made from previous practice was the Selbach engine, which was seen for the first time applied to automobile work. An illustrated description of it was given by us recently (December 26, 1903, p. 1398). Its special feature is that the inlet and exhaust valves are combined together, are operated by a single cam, and are fitted into the centre of the cylinder head from above. This combined valve is mechanically operated, it acts as an inlet-valve when opened to its fullest extent, and puts the cylinders into connection with the exhaust-valve when opened to a less extent. Mr. O. C. Selbach exhibits a chassis of the live-axle type, fitted with one of these twin-cylinder engines.

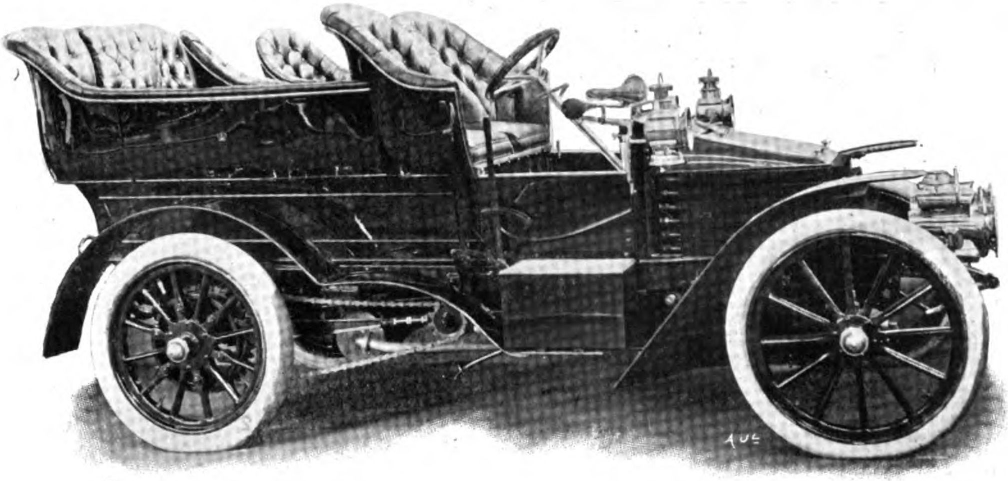
The majority of the crank-shafts employed in petrol engines are of very much stouter construction than before, and are now almost invariably made from solid forgings—often nickel-steel. They are not infrequently lightened by having holes bored through them, and many constructors make use of hollow crank-pins for leading the oil into the centre of the big end bearings of the connecting-rod, instead of merely trusting to its finding its way to these bearings on the splash principle. The crank-pins are thus lubricated on the Crossley, Belsize, and Pick engines, to mention only a few. A notable exception to the practice of employing solid forgings for the crank-shaft is found on the Ryknield car, for which the crank-shafts are built up, whether for a 2-cylinder or for a 4-cylinder engine.

A considerable difference is found in connection with the crank-shafts employed on the 6-cylinder engines which were shown at the Palace, the crank-pins being arranged in a variety of ways in relationship to one another, and the cylinders being consequently allowed to fire in a different order. The arrangement of the crank-pins is shown diagrammatically in one of our illustrations, in reference to which we need hardly point out that the pins are always set so that they lie at an angle of 120 degrees from one another, in pairs.

On most of the cars of the live-axle type the strength of the axles has been very considerably increased, and nickel steel is very frequently employed for their internal revolving shafts. The practice of mounting the road wheels so that they revolve upon the stationary tubes containing the live-axle, instead of being fixed rigidly to the revolving shafts, has now many supporters; it was, we believe, originally introduced by the Decauville Company, and is now also found on New Orleans, Ariel, and Dennis cars, amongst others.

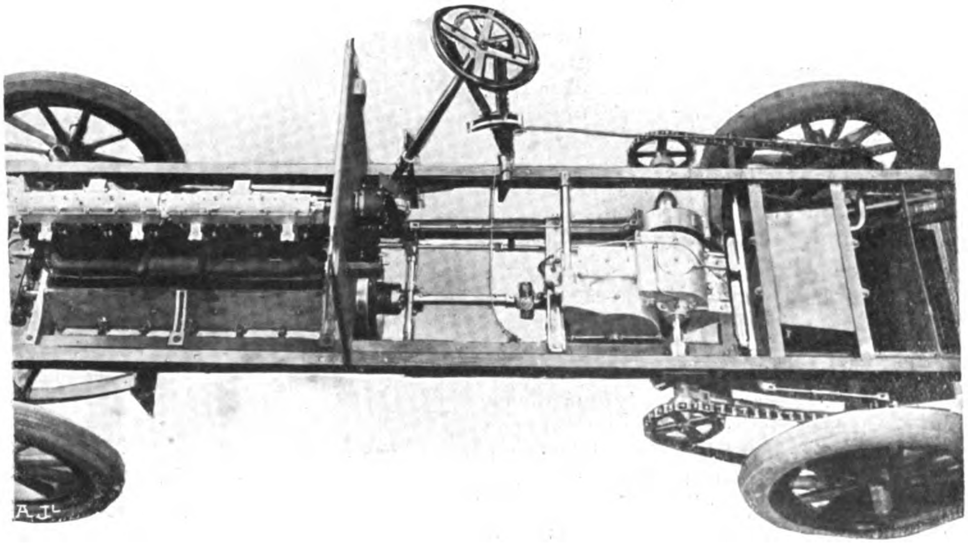
In conjunction with live-axles, the radius-rods connecting them with the main frame are arranged in a variety of ways by the different makers. Sometimes a single and almost central rod is alone provided, this usually relieving the side-springs of the twisting strain only, but allowing them still to take the "drive." It is then usually connected with the frame through a cushioning spring, which absorbs much of the shock imposed at starting. Other makers, however, fit the usual kind of radius-rods at each side of the car, for taking the drive, these being employed alone or in conjunction with a third central connection. The construction of the propeller shaft and its universal joints, too, varies very considerably on the different vehicles, it having joints at both ends or a joint at the forward end only. In the latter case it is usually enclosed in a tube, which is rigid with the stationary portion of the live-axle. and the tube can then replace the central radius-rod, An example of this is the new car shown by the Standard Company. The universal joints employed vary considerably in form, and there is a tendency towards designing them with neat, metal, dust-proof cases, instead of leather coverings. One or both on several propeller shafts are, strictly speaking, only universal joints over a comparatively small range of motion, and are more of the nature of flexible couplings, in which a certain amount of longitudinal play is also provided for. Amongst new designs in the way of universal joints, attention might be called to that on the rear end of the shaft on the National car—a British car shown at this Exhibition for the first time; it is best described as an ordinary universal joint turned inside out, so that the pivot pins project radially outwards from the forked arms instead of inwards, and are carried by a split external ring instead of by a central ball.

We referred briefly last week to the general question of change-speed-gears at the Show, and now add some

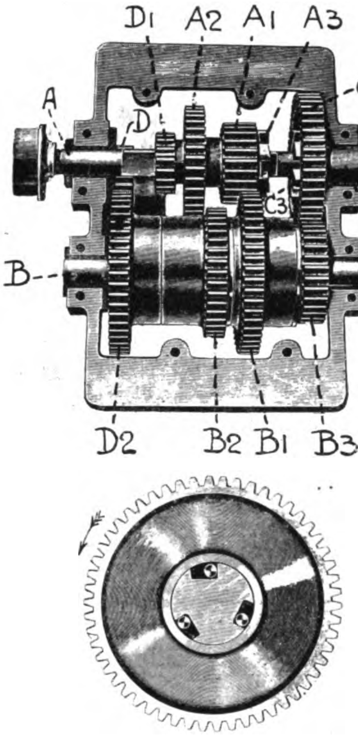

A 24-h.p. "Double Tulip" Wolseley Car.

further particulars with regard to them. Of epicyclic gears, it is interesting to notice that the Duryea, Lea-Francis, the Eagle, and the Baker, all provide a low speed and a reverse with one train of wheels instead of with two, besides being arranged so that they revolve as one solid piece when the higher gear is in use. The two first-mentioned are specially designed to suit the original systems developed by their makers, but the Baker gear, which was shown on a standard De Dion Chassis, has the same outward form and is about the same shape as an ordinary change-speed-gear of the sliding spur wheel type, for which it can be substituted. The Langdon Davies gear, which we described last week, is another new form which can be adapted to suit existing vehicles, and, as we then explained, it practically renders this portion of the vehicle suitable for use in the hands of the least experienced driver, since the actual changes of speed are brought about by the clutch pedal, and it is impossible to change gear until that pedal is depressed; it is, too, remarkably simple and compact, besides being entirely self-locking. In some respects it resembles the well-known Brooke gear, which has proved so satisfactory in practice, in which chains and sprockets are used instead of spur wheels in the gear-box, and jaw clutches are employed for introducing the required speed.

A somewhat unusual arrangement of the gear-box is seen on the Aries cars, a make of vehicle which was shown in this country for the first time. The differential counter-shaft on this chain-driven vehicle is mounted in a separate casing, and is connected with the change-speed-gear by a flexibly jointed shaft; the sliding wheels in the gear-box itself are controlled by a horizontal cam-plate, which is fitted into the top of the gear-box. The greatest novelty, however, in the way of change-speed mechanisms of the sliding spur-wheel type was the Hitchon-Weller gear, of which we give an illustration. It will be noticed that the driving shaft, A, together with its spur-wheels, A^1, A^2, and D^1, and its top-speed jaw-clutch members, A^3, is arranged in the usual way in relationship with the driven shaft, C, and the lay-shaft, B, and gives a direct through drive on the top-speed. The shaft, C, is connected with the propeller-shaft by the coupling, C^2, and carries the wheel, C^1, which has jaw-clutch members, C^3. The wheels, A^1, A^2, and D^1, correspond with the wheels, B^1, B^2, and D^2, to give the first, second, and


The 40-h.p. 6-Cylinder Maudslay Chassis.

reverse speeds, an intermediate wheel, D, being introduced between the wheels, D^1 and D^2. The unusual features in this gear are that the wheels, B^1 and B^2, have free-wheel clutches introduced between them and the lay-shaft, B, so that the shaft can overrun them when called upon to do so. The result of this is that all three forward speeds can be introduced at the same time without doing any damage—this is only done at the moment of introducing the top gear, when the jaws, A^3, begin to engage with the jaws, C^3, and before the wheels, A^1 and A^2, have ceased to be in mesh with the corresponding wheels, B^1 and B^2. It will be noticed from the illustration that the wheel, A^1, is twice as wide as usual, and that the second-speed wheel, A^2, will come into mesh with its corresponding wheel, B^2, whilst the wheels, A^1 and B^1, are still in gear. When the second speed is introduced, the lay-shaft, B, will be caused to revolve quicker than the wheel, B^1, is tending to turn it, so that the free wheel will come into action and allow the shaft to overrun the wheel. The presence of the free wheel inside, B^1, also renders it easier for the wheel, A^2, to engage with it, because there is a certain amount of play between the shaft, B, and the wheel, B^2. A similar effect is produced as the top speed is being introduced, for as soon as the jaws, A^3, engage with the jaws, C^3, the lay-shaft, B, is caused to overrun both the gear wheels, B^1 and B^2. When the top-speed jaws are in thorough engagement with one another, then the wheels, A^1 and A^2, cease to be in mesh with the wheels, B^1 and B^2, but they immediately re-engage with one another as the jaws are moved apart again. This gear mechanism appears to render gear-changing an extremely simple and easy matter, besides enabling the dimensions of the gear-box to be reduced.



View of the Hitchon-Weller Change-Speed-Gear, and of one of the Free-Wheel Clutches.

In the way of hand-levers for changing speed, comparatively few vehicles follow the well-known De Dion lines by mounting these on the steering pillar. This method,

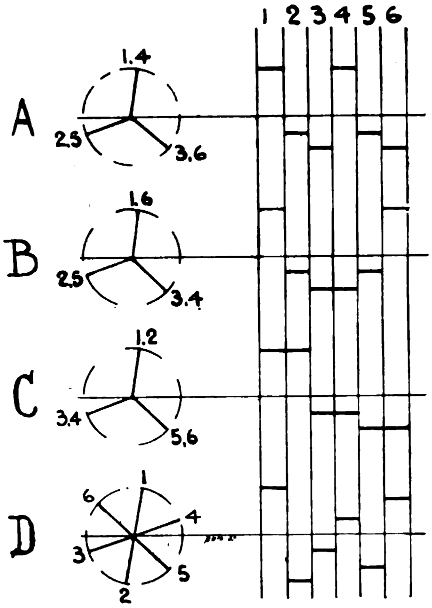
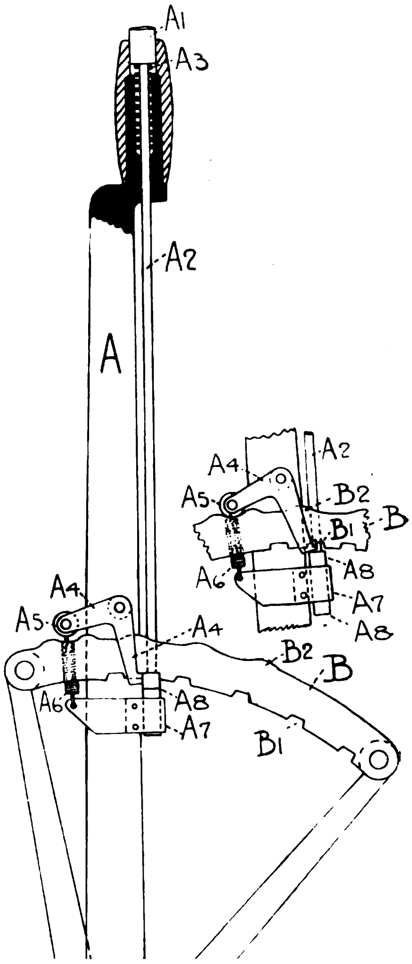
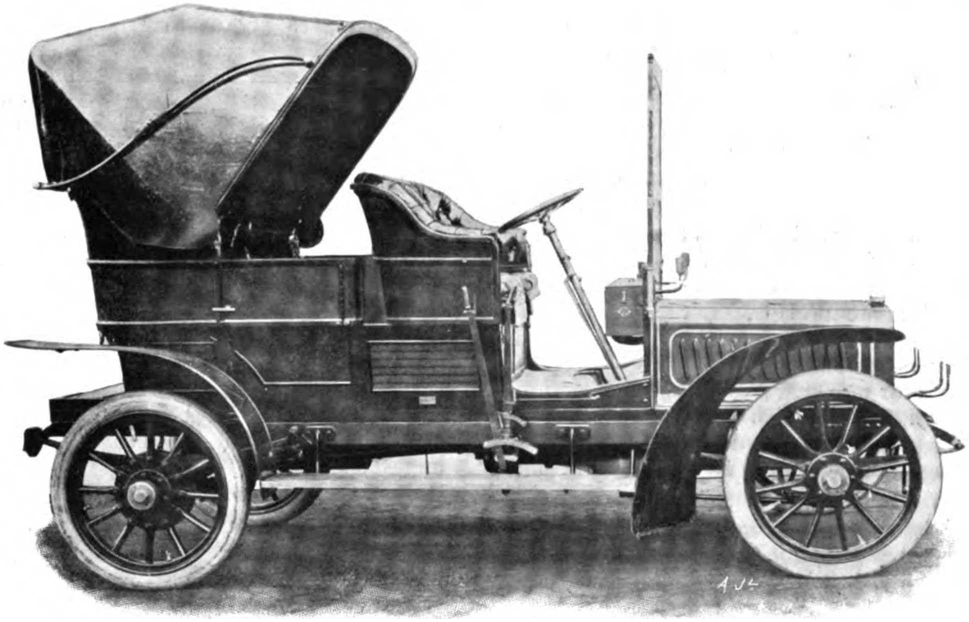


Diagram showing the arrangement of the 6-cylinder cranks on the different engines exhibited at the Show.

A represents the arrangement on the Napier and Ariel cars; *B* the Maudslay and Spyker cars; *C* the Marston car and the equivalent arrangement of the Wilson Pilcher car had the cylinders been vertical; *D* the actual arrangement on the Wilson Pilcher car which has opposing horizontal cylinders.

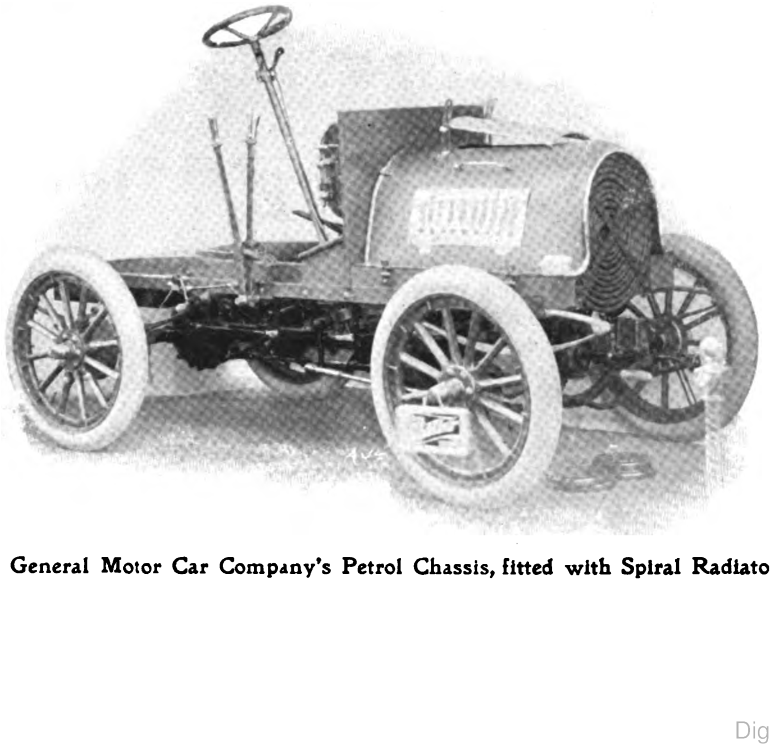


The Wolseley Change-Speed-Lever and Quadrant, showing Self-Locking Catch Mechanism.



A 14-h.p. Decauville Hooded Phaeton.

however, is adopted on the Cudell, and on some of the small Humber voiturettes. The more usual side-levers either move notch by notch over a single quadrant, or are fitted, Mercedes fashion, to move backwards and forwards in either of alternative slots. In the Wolseley and Siddeley cars, which have the levers arranged in the former manner, provision is made for reducing the risk of "running through" too far when changing from one gear to the next. The Wolseley device is shown in the accompanying illustration, where it will be noticed that the ordinary catch, A^8, which engages in slots, B^1, on the underside of the quadrant, B, and can be depressed by pressing the knob, A^1, on the top of the gear-lever, A, is arranged in conjunction with a small bell-crank lever, A^4, in such a way that the catch, A^8, is held down by the bell-crank lever, A^4, when once it has been depressed. When the hand-lever is locked in any particular position, it is only necessary to press the small knob, A^1, before changing speed, and the lever is then unlocked and free to move in either direction. It will be noticed, however, that the bell-crank lever, A^4, is fitted with small rollers, A^5, at its other end (where the spring, A^6, acting upon it is attached to it) and that the quadrant is formed with cam-like projections, B^2, at intervals on its upper face. These cam projections come in contact with the rollers, A^5, as the lever is moved from one notch to another, and they cause the bell-crank lever to release the catch, A^8, and to allow it to drop into the next notch. In the drawing, we have shown the bell-crank lever, A^4, and the catch, A^8, in their two positions—when the hand-lever is locked, and when it has been released just prior to changing gear. On the Siddeley car, the quadrant is also arranged on both sides of the change-speed lever, but the lever can be moved a certain distance sideways in it. Each side of the quadrant has small projections on its



A General Motor Car Company's Petrol Chassis, fitted with Spiral Radiator.

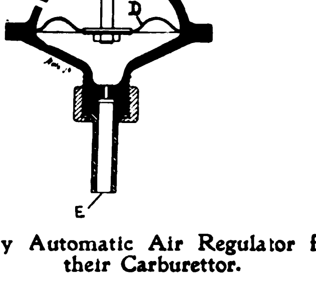
inner face, which correspond with the various positions of the lever, and act as stops for it. When changing from one speed to the next, it is either necessary to press the lever in against one side of the quadrant or push it out against the other, according as to the direction in which the lever is to be moved. The lever is then free to move the precise distance required to introduce the next speed, but is prevented from going further by one of the stops, until it has been moved sideways to clear that stop.

It is quite usual for safety catches of one kind or another to be fitted for preventing the "reverse" from being introduced unintentionally, and the advisability of providing these has been ingeniously taken advantage of by some makers for simplifying the construction of the gear-box, and for reducing its size. On the 6-cylinder Marston car, for instance, which only has two forward speeds—the top speed being a direct-through-drive—a slot is cut through the side of the quadrant at its centre, so that the lever when in its neutral position can be moved into it; the slot, however, is normally closed by a hinged block, which has to be lifted up out of the way before the "reverse" can be brought into use. A similar arrangement of the lever is found on the latest 12-h.p. New Orleans car, in the gear-box of which the "reverse" is introduced by rocking intermediate wheels on a fulcrumed arm carrying them, so that they engage with the first-speed wheels. Curiously enough, and although we have, on more than one occasion, suggested and advocated it, no makers appear to have connected the change-speed lever with the sprag (or its corresponding mechanical equivalent, the pawl and ratchet wheel) in such a way that it is impossible to introduce the reverse whilst the sprag is down. In the majority of cars it would be a comparatively simple matter to do this, and in those having safety devices, such as those we have just referred to, it would be easier still. It is true that the great improvement in brakes has led many makers to discontinue the employment of the old-fashioned form of sprag; but, as we have already pointed out, there are many new cars having some sort of ratchet and pawl equivalent, which is effective for preventing the car running backwards on hills, and is only dangerous if the driver should forget to disengage it before "reversing."

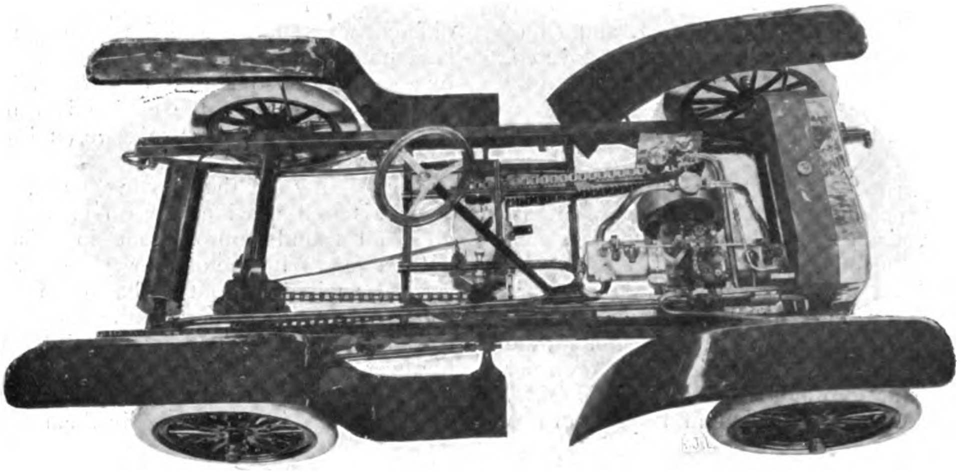
The question of the use of ball-bearings in motor car construction is one upon which there is apparently more diversity of opinion than upon almost any other matter. This is so much the case that on many of the stalls at the Exhibition, special emphasis was laid upon the fact that no ball-bearings were used anywhere except as thrust bearings, whereas on the other hand, other manufacturers announced, with equal pride, that ball-bearings were used throughout, except on the engine. There is no doubt that there are ball-bearings *and* ball-bearings, and it is probable that this fact accounts for the phenomenon. It is significant, however, that many of the best known vehicles employ ball-bearings for all the running parts of the mechanism between the clutch and the road wheels, for the steering gear, and for the road wheels themselves, and it is evident, too, that when properly made, they are thoroughly satisfactory in practice. Doubtless their special advantage is that they reduce the effort required at starting, while it is probable that well-made plain bearings—when lubricated as effectively as they usually now are—are practically as efficient when actually travelling at normal speed. Examination shows that, in the matter of design, the various forms of ball-bearings employed differ enormously, particularly when they are constructed to act as thrust bearings, in addition to performing their usual functions. The only really novel form which we came across at the Show was one in which four points of contact are made with each of the balls, there being a floating cone to render it self-aligning, and to ensure equal contact on the four points.

Quite a number of new forms of radiator have been introduced since last year, and an enormous variety of patterns were on view at the Show. Varieties of the honeycomb type were numerous, some having vertical tubes, others horizontal tubes, and in several the air passes between the tubes whilst the water flows through them. The improved efficiency, both of the coolers themselves and of the engines, was well demonstrated by the reduced size of the radiators and by the very general abolition of any supplementary water-tanks. Cheaper methods have been adopted for constructing those of the honeycomb type proper, besides which, fluted tubes for increasing the cooling surface are by no means uncommon. Radiators built up of finned tubes, in such a way as to resemble the true honeycombs were numerous, and many of them had quite as neat an appearance, although, doubtless, much cheaper to make. In this connection, mention should be made of the new Duryea radiator, the tubes for which are covered with an ingenious sheathing built up of bent wire in such a way that it holds itself in place about the tube and forms a regular spiral, having a triangular cross-section, along the tube. On one of the vehicles shown by the General Motor Car Company the radiator is formed of plain tubing bent round into a spiral as seen in one of our illustrations.

In addition to the automatic carburettors mentioned last week, the new forms introduced by the Wolseley Company and the Napier Company are particularly interesting. In the Wolseley device, the admission of auxiliary air, to dilute the explosive charge formed in the mixing chamber, is regulated automatically in accordance with the pressure in the exhaust pipe, so that as the engine runs faster—or as the throttle valve is opened wider—a greater quantity of additional air finds its way into the induction pipe. Referring to the illustration which we give of the Wolseley automatic valve, it will be noticed that the auxiliary air holes, A, are normally closed by a piston valve, which is held in this position by an adjustable coiled spring, B. It will be understood that the air, entering at A, finds its way through the



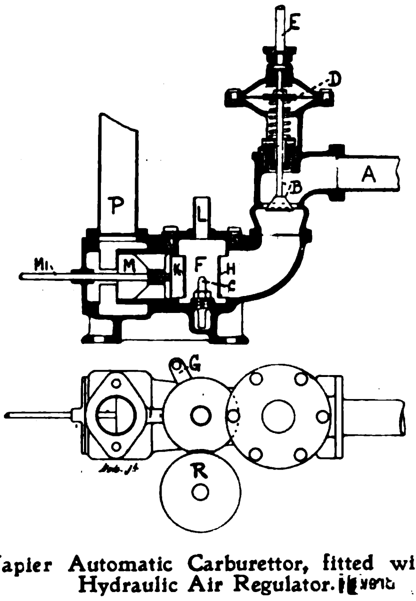
The Wolseley Automatic Air Regulator for use with their Carburettor.



View of the Pick Petrol Chassis from above.

fitting, C, to the induction pipe, where it mingles with the main air supply, which has been carburetted during its passage through the mixing chamber. The spindle of the mixing valve is fixed to a diaphragm, D, the periphery of which is held between the flanges of the castings forming the chamber for it. The pipe, E, leads into the space immediately beneath the diaphragm and is at its other end connected with the exhaust pipe. The position of the diaphragm, and consequently of the valve, therefore depends upon the pressure in the exhaust pipe, the diaphragm being forced upwards to a greater or less extent against the action of the spring, B. The space above the diaphragm is closed to the atmosphere except for a small hole passing through the chamber, so that a kind of cushion is formed above it to act as a dash pot and to prevent what is commonly known as "hunting," *i.e.*, to prevent the diaphragm from responding too sensitively to minor variations of pressure in the exhaust.

In the Napier carburettor, the hydraulic air regulator, of which we gave an illustrated description on Oct. 24th last, is fitted, as seen in our illustration. This regulator has a diaphragm, D, to which is attached a conical valve, B, which more or less obstructs the main air supply passing through the pipe, A, to the spray-jet, C. The upper portion of the diaphragm chamber is connected by the pipe, E, with the water-circulation system, so that the position of the valve, B, depends upon the speed at which the circulating pump revolves, and therefore on the speed of the engine. As the speed increases, the diaphragm, D, is depressed against the action of its spring, and the valve, B, offers less resistance to the entering air. The carburettor is of the float feed type, the float being contained in the chamber, R, which is, as usual, in open communication with the jet, C. A certain amount of auxiliary air is allowed to enter the mixing-chamber, F, through the pipe fitting, L, from which a rubber pipe passes to the dashboard of the car. The quantity of air can be regulated by a shutter on the dash to suit atmospheric and other varying conditions, but does not require any constant attention. The passage of the explosive mixture from the mixing-chamber, F, to the induction pipe, P, is controlled, as usual, by a throttle-valve, M, the spindle M^1, of which is connected with the governor, and in our drawing it will be noticed that a vertical sleeve is mounted around the jet. This sleeve has ports at H and K on either side, the former to admit the main air supply, and the latter to permit the mixture to pass to the throttle-valve, M; it can be turned about its axis by the lever, G, which projects from it. This hand-throttle has the effect of increasing the suction in the mixing chamber, as the volume of the charge is reduced by it. The automatic portion of the carburettor causes the valve, B, to open wider, as the speed of the engine increases (as we have already said), and it thus tends to ensure constant richness of mixture by maintaining an approximately constant suction in the mixing chamber. When the degree of vacuum in the mixing chamber tends to increase in consequence of the engine running faster, this valve, B, places it in more direct communication with the atmosphere, and therefore has the effect of preventing a higher degree of vacuum from being produced.

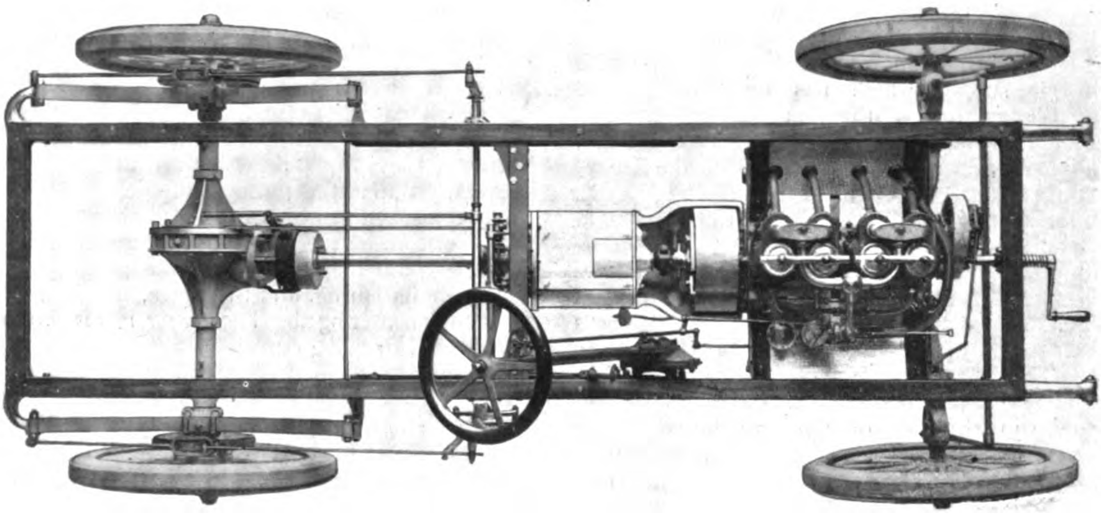


The Napier Automatic Carburettor, fitted with their Hydraulic Air Regulator.

An automatic carburettor, somewhat on the lines of that fitted to the Crossley vehicle, is being developed for the National car, in which a liquid instead of mercury is used as a medium. On the Dougil car, the carburettor has four downwardly-projecting spray-jets, each of which is adjustable as to effective area, and all of which are normally closed by small leather-covered, pedal-shaped levers, which are held up against them by adjustable springs. The main air supply passes down around all these jets, but is baffled by the four pedals. The action of the air on the pedals is to depress them, and to thus allow the petrol to flow through their jets. The springs holding the pedals up are all of different strengths, and when the engine is running slowly the suction is only sufficient to open one of the pedals and to expose the one jet. As the speed increases, however, No. 2 jet is brought into operation automatically, then No. 3, and finally No. 4. On the particular engine exhibited, the second jet is allowed to come into play at 200 revs. per minute, the third at 400, and the fourth at 600 revs. per minute approximately—the maximum speed of this particular engine being 800 revs. per minute. In the new carburettor which replaces the well-known measuring device on the larger Gobron-Brillié vehicles an approximately constant degree of richness is maintained by arranging a conical valve around the spray-jet in such a way that it is simultaneously raised as the throttle-valve is closed, the degree of vacuum in the mixing-chamber being thus rendered more or less constant.

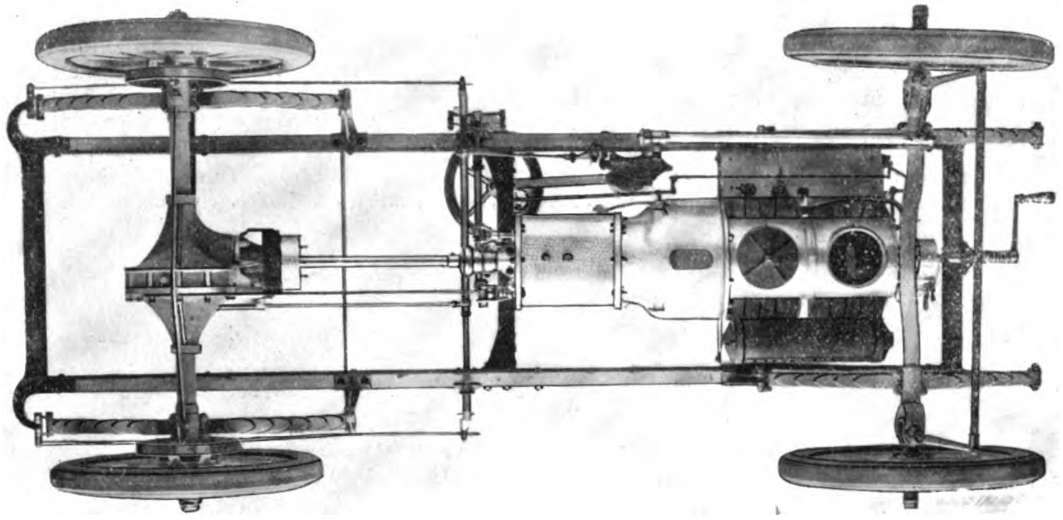
The carburettor now fitted to the English-built Duryea vehicles is of a type which has been to a considerable extent in evidence on various stalls at the Show, and is perhaps best known in connection with the new Mercedes cars. In these carburettors, an auxiliary air-valve is interconnected with the throttle-valve, so that the former commences to open when the throttle-valve has been opened to a greater extent, and continues to open wider simultaneously with it. Another favourite type of carburettor is that which we described in connection with the Talbot cars recently, in which a spring-loaded mushroom valve controls the auxiliary air inlet; valves of this kind are used with the James and Browne engine amongst others. A very similar type of valve, too, is now used on the Pick engines, but in a somewhat different way, and for a different purpose. This valve is mounted on the induction pipe and is held on its seat by a spring, the strength of which can be varied by the driver, so that when the engine is running light, the engine receives a weaker mixture, unless it is running very slowly.

Accessibility of the moving parts, particularly the engine, is well provided for on most of the cars, very great all round improvement in this respect being noticeable. With the ordinary type of vehicle, having a vertical engine in front, it has been, of course, comparatively easy to so perfect the bonnets that they can be quickly raised or entirely removed. With such cars, however, as the Duryea and the Lea-Francis, considerably more ingenuity has been required, though any difficulties in this respect have in them been most successfully overcome. In both these cars it is quite easy to get at any portion of the machinery, and, when the necessary parts of the body have been hinged up out of the way, the mechanism is, if anything, even more thoroughly accessible than it is on the more orthodox types of vehicle.



View of the New Orleans Company's latest 12-h.p. Chassis from above.

No apology is needed for again referring to the Lea Francis car, of which we gave a general description last week, for it has been the one real novelty of the Show, and the workmanship is so excellent that it has attracted the attention of all. The long connecting rods are milled out of solid steel, the bore and stroke of the 3-cylinder engine are 4 in. and 6 in. respectively, and the governor is set to limit the speed to 750 revs. per min. All the moving parts of the engine are lubricated by an oil pump of the gear-wheel type, which draws the oil from the base of the crank-chamber, and forces it through the hollow crank-shaft to its bearings, and through pipes fixed to the connecting-rods to the gudgeon-pins and to the pistons. Every part, therefore, receives its supply of oil regularly when the engine is running, and the amount varies with the speed. The oil pump is fixed to the same spindle as the water-pump, and both are of the same gear-wheel type. They are operated by an eccentric on the longitudinal shaft that drives the cam-shaft, the eccentric being connected with them through a ratchet and pawl device. The longitudinal shaft runs at the same speed as the crank-shaft, and terminates in front of the main frame in a small gear-case, containing two-to-one spur-gear for driving the commutator. The commutator is therefore very accessible from the front of the vehicle, where it is enclosed. The centrifugal governor acts upon a throttle-valve, which is also connected with another valve regulating the main air supply in such a way as to render the carburettor automatic. The throttle-valve is also connected with a small hand-lever above the steering wheel, which lies on the opposite side of the wheel, to a similar lever timing the ignition. These little levers project up from horizontal rods above the wheel; the one is made of white material, and the other is black, to avoid confusion. The change-speed-gear is operated by a single side-lever, which moves forwards and backwards over a simple notched quadrant. An ordinary clutch pedal is also fitted in conjunction with it, and it withdraws whichever of the two main clutches may happen to be in operation whenever it is depressed. The low speed and "reverse" epicyclic gear, which is introduced between the high-speed clutch and its side chain, consists of a single train of gear wheels and is so arranged in a neat case that it revolves as one solid piece, except when actually in use. The live-rear-axle and the road wheels are mounted in roller bearings, and have ball thrusts; and the main bearings of the transmission gear are similarly equipped. The live-axle is constructed with a solid shaft passing through from end to end, and the differential gear is of the spur-wheel type. The footbrake acts upon the shell of the differential gear, and the side brakes, which are compensated, are fitted to the hubs of the rear wheels. The standard body gives ample accommodation for four passengers, and the dash lies right in front. The engine is rendered accessible by constructing the front portion of the car in such a way that it can be swung right up out of the way, a strong gate which carries a large central lamp acting as a lock for it when replaced.

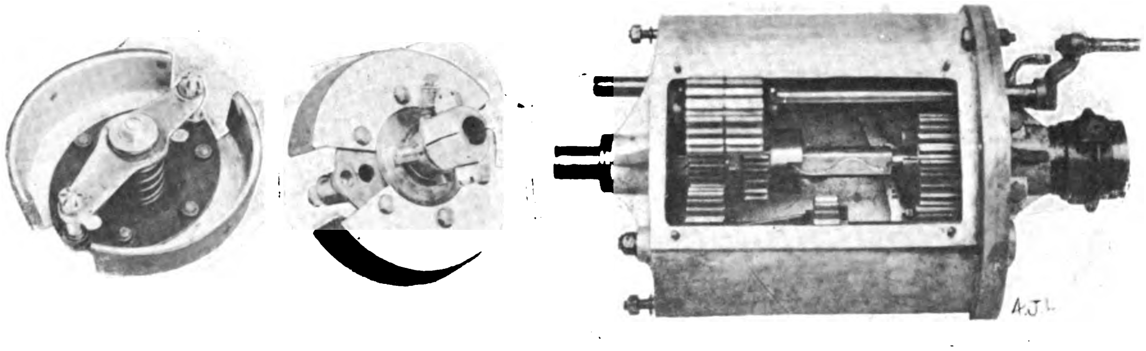

View of the New Orleans Company's latest 12-h.p. Chassis from beneath.

The Pick petrol cars have been considerably improved this year, and were shown in two sizes, with 6 and 10-h.p. engines respectively. Both types are of similar construction, having main frames constructed of wood and of steel tubes, a horizontal engine fixed in front, a centrally-placed change-speed-gear, and single chains both from the engine to the gear and from the gear to the live-back-axle. The engines are of that type in which the cylinders are mounted on opposite sides of the crank-chamber, slightly out of line with one another, with the crank-shaft between them; the crank-shaft lies transversely in the car, and has an internal cone clutch on its one end from which a Renolds silent chain is led to the first-motion-shaft of the gear-box. The engine has atmosphere inlet-valves, and is fed with oil from a lubricator in which pressure is maintained by the exhaust gases. The revolving parts are lubricated through hollow crank-pins, into which the oil is thrown by centrifugal force. The cylinders on the 10-h.p. engine have a bore of 3¾ in., and the stroke is 4 in.; on the smaller engine the bore and stroke are 3¼ and 3¼ in. respectively; the normal speed of both engines is 1,500 revs. per min. No automatic governor is fitted; the speed of the engine is controlled by a foot-pedal and by a single lever above the steering wheel. A high tension ignition system is employed, and no provision is made for "timing." The regulating lever and pedal control the strength of a spring which holds an auxiliary air-valve on its seat in the induction pipe, so that the richness of the mixture can be reduced, and the force of the explosion varied in this way. The cylinders are water-cooled, and the water is forced through the radiator by a pump of the wing type. The main clutch is of the internal cone type, and has metal-to-fibre friction surfaces. It is controlled by a foot-pedal, and is withdrawn against the action of a spring by a disc cam on the shaft. The same pedal when further depressed applies a brake on the shell of the differential gear. The change-speed-gear is of the ordinary sliding-spur-wheel type, and the sliding wheels are carried on the second-motion-shaft. The chain connecting the gear with the main clutch can be tightened by moving the engine bodily forward, and the other chain which transmits the power from the gear-box to the back axle is adjustable by side radius rods in much the usual way. The rear axle is stiffened by an additional tubular member passing from end to end, and the rear wheels are fitted with the "cam" brakes previously shown by the company.

The new feature of the Century Company's exhibit was their 10-h.p. type of car which is fitted with a twin-cylinder Aster engine having a bore of 88 mm. and a stroke of 110 mm. One of these chassis, shod with solid rubber tyres, was shown with a light delivery-van body, geared to about 15 miles per hour, and intended to carry loads of about 15 cwts. This company carry out the whole of the coachwork and upholstery themselves, and obtain a high-class finish on their cars.

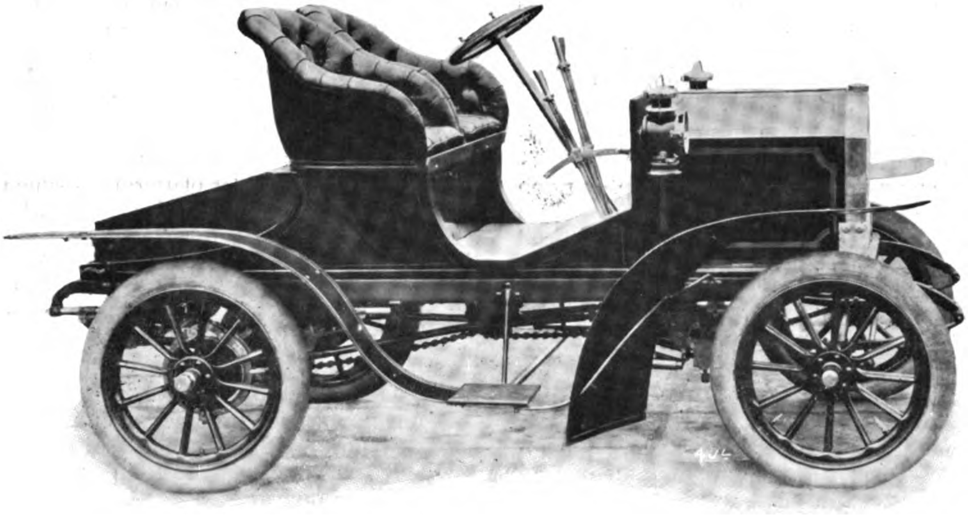
The Arrol-Johnston vehicles, shown by the Mo-Car Syndicate, are practically unchanged since last year. The company also showed an estate wagon, having the necessary mechanism for tipping the body, in which their Standard equipment is used, but its live axle is employed as a countershaft from which the power is taken by side chains to the rear wheels—these being mounted on a solid stationary axle.

One of the accompanying illustrations show the new main clutch which is fitted to the latest 12-h.p. New Orleans car. We have already referred to this, and have pointed out that it is of the internal cone type, and has its inner member constructed in two pieces, so that it is rendered easily detachable. It will be seen that these two pieces do not form a complete circle, and that the spring which holds them in engagement is contained inside them. They have leather-lined friction surfaces, and are made of aluminium. This 12-h.p. chassis is of a very neat design throughout, and has been simplified down as far as possible so as to enable it to be put on the market at a comparatively low price. It has an armoured wood frame, with angle cross-members to which the engine and the gear-box are attached direct. The gear-box is rigidly fixed to the crank chamber by an intermediate aluminium casting, which encloses the lower half of the flywheel. The engine is of the 4-cylinder type, with atmospheric inlet-valves, and runs at a normal speed of 900 revolutions per min., the cylinders have a bore of 85 mm., and the stroke is 110 mm. The crank-chamber is built up of two castings only, one of which forms the rear end, and the gear-box too is made in just the same way. The speed of the engine is controlled by a governor acting on the throttle-valve, and is subject to the control of an accelerator-pedal which lies close up to the clutch-pedal, so that it is depressed whenever the clutch is disengaged. The only levers on the steering-pillar are those which vary the time of ignition and regulate the mixture in the carburettor. The change-speed-gear provides three speeds and a reverse, with a direct-through-drive on the top speed, and the lay-shaft is so arranged that it remains at rest when that speed is in use. The general appearance of the gear-box is shown in our illustration; the two intermediate gear-wheels which are rocked over into position to give the reverse are clearly seen in the top of it. The forward-speeds are operated by a side-lever in the usual way; it is drawn back for the first-speed, and pushed forward to give the second and third consecutively. A safety-catch lies alongside it when in its neutral position in the quadrant, and if this is lifted up the lever can then be drawn in sideways when it rocks over the intermediate reverse wheels already referred to. The propeller-shaft, connecting the gear with the live-back-axle, has its universal joints completely enclosed in metal sheathings, and the joint at its forward end is so constructed that the shaft can be detached very readily. A single radius-rod is introduced between the casing surrounding the differential gear and the gear-box. The foot-brake is mounted at the back end of the propeller-shaft, and the usual side-brakes are also fitted. The wheel base is 7 ft. 4 ins., the track 4 ft. 2 ins., and the pneumatic tyres are 810 by 90 mm. The revolving shafts forming the back axle are 40 mm. in diameter, and run in long white metal bearings.



The 12-h.p. New Orleans Car. Two views of the Internal Member of the Main Clutch, and a top view of the Change-Speed-Gear.

The 6-cylinder Marston car has a pressed steel frame, and is built so that the centre of gravity is kept very low. The mechanically-operated inlet-valves are arranged on the opposite sides of the cylinders to the exhaust-valves, and the cams operating them are so shaped as to give a variable lift when the shaft carrying them is slid longitudinally. The flywheel forms a fan for drawing air through the radiator, and an expanding metal-to-metal clutch is fitted into its centre. The engine and the gear-box are both fitted direct to the main frame, and the side chains, which pass from the differential countershaft to the rear wheels, are enclosed in "Sunbeam" oil-retaining



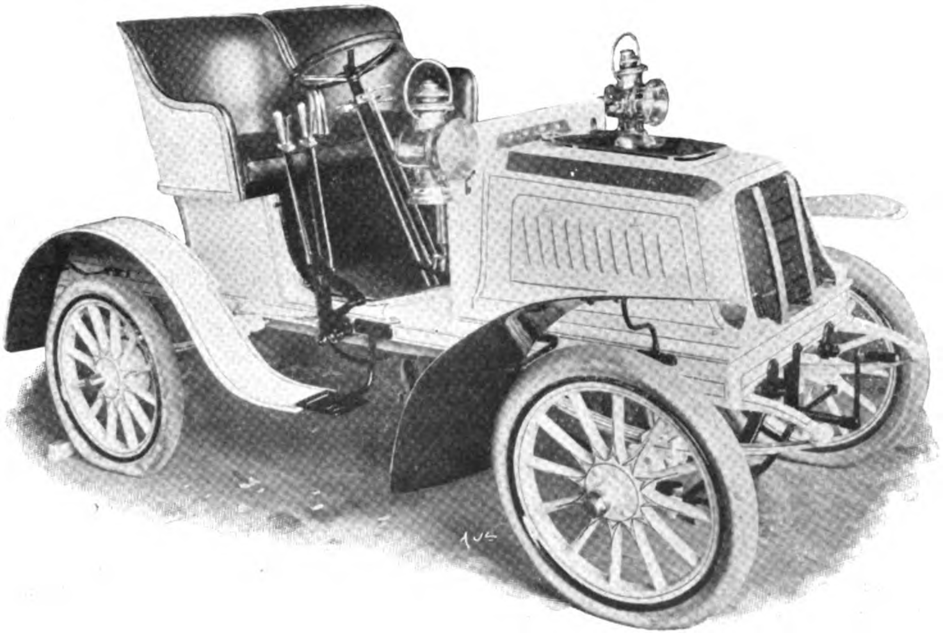
The "Belsize Junior" Petrol Voiturette.

gear-cases. The change-speed-gear gives two forward speeds and a "reverse," the top speed being a direct drive to the countershaft, with the lay-shaft thrown out of operation. A chain-driven commutator is fixed on the dash, as also is a belt-driven lubricator and a greaser for the gear-box. The mechanism is entirely enclosed, on the underside, by a steel shield. As usual, this and the other Marston cars have as well-finished carriage work as any in the Show.

The 18-24-h.p. Wilson Pilcher chassis attracted a great deal of attention during the whole time the Show was open. The mechanism was shown in motion, and several parts of it were exposed to view to show the unique gear wheels which form such an important feature. Both the 6-cylinder model and the 4-cylinder, 12 to 16-h.p., chassis have been considerably improved during the past twelve months; several of the novel features have already been referred to in our columns.

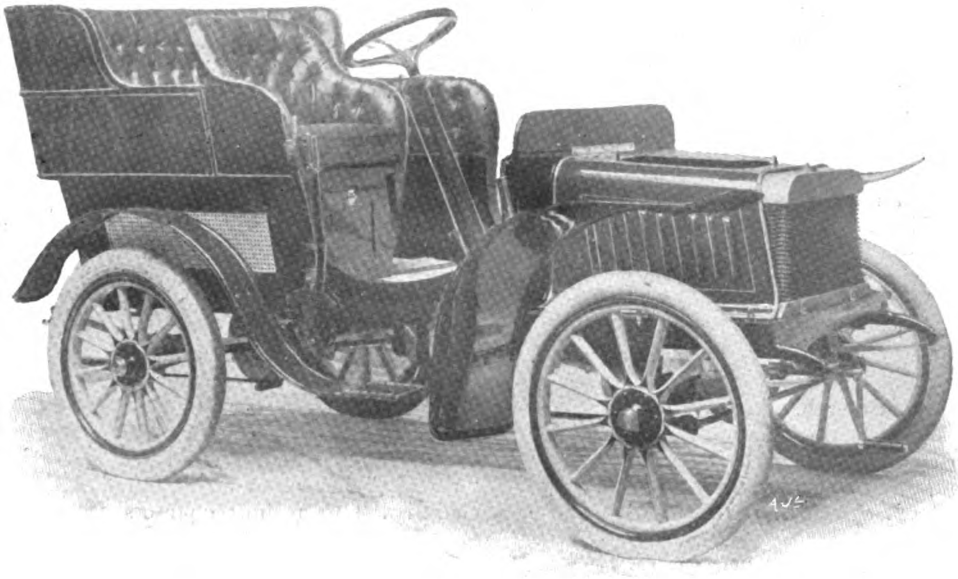
Quite a large number of small voiturettes were, as we have already indicated, shown at the Exhibition, those built by the Wolseley Company and the Humber Company receiving special attention from the visitors. The general design of the Wolseley voiturette, which now has three forward speeds and a "reverse," is already well known to our readers. The arrangement of its single-cylinder, horizontal engine, with chain transmission to the gear-box, and another single chain to the live-rear-axle, renders the entire mechanism very accessible. The company have recently given considerable attention to the improvement of their silencers, and have made several minor improvements in all their well known models. We have already dealt with their automatic carburettor.

Another little voiturette in which two separate chains are employed for transmitting the power from the engine in front to a live-rear-axle is the Belsize Junior. In this little car, however, a vertical engine is employed, and the gear-box, which gives three forward speeds and a "reverse," lies close up to and alongside it. The first chain is led to a short countershaft mounted centrally



The "No Name" Voiturette, built by the Horley Motor Company.

beneath the car, and the second chain passes from this same countershaft to the back axle; both chains are entirely enclosed. The main frame is of pressed steel, and has two intermediate cross-members. Both ends of the rear springs are connected with the frame by sockets sliding on steel pins, and the rear ends of the front springs are attached in the same way. The engine has a single cylinder having 4½ in. bore by 5 in. stroke, gives 7-b.h.p. at 1,000 revs. per min., and has its mechanically-operated inlet-valve—as also the similarly-actuated exhaust-valve—arranged vertically above the cylinder. The flywheels are contained inside the crank-chamber, and the engine is fixed to one side of the centre line of the car, with its shaft arranged transversely. The longer end of the shaft projects right through the gear-box, carrying a cone-clutch on its extreme end. The clutch serves to connect it with a sleeve, between which and another sleeve carrying the sprocket close up to the crank-chamber jaw-clutch members are arranged. Two lay shafts, one in front of, and the other behind, this central shaft, are so arranged with sliding spur-wheels that the one gives the first-speed and the reverse, whilst the other can give the second-speed. The sliding members on each of the three shafts are controlled by a simple cam-plate, which is operated from one of the hand-levers (seen in our illustration) alongside the steering-pillar. The other hand-lever near it applies the brakes to the rear-wheels. The engine is fitted with an automatic governor, which is controlled from a small hand-lever above the steering-wheel, and another small lever alongside regulates the time of ignition, The steering-gear is of the worm and nut (with toothed rack) type, and, as seen in the illustration, the car is fitted with wooden wheels and pneumatic tyres. The wheel base is 6 ft. 3 in., the track 4 ft., the weight 7½ cwt., and the tyres 28 in. by 3¼ in. The short countershaft in the centre of the car is mounted in ball-bearings carried on specially shaped radius rods, which pass from the ends of the back axle, and are adjustably connected to the main frame, where they meet together in front; provision is also made for adjusting each chain separately. The rear axle is very strongly constructed, and the revolving parts are enclosed in an aluminium casing. Foot-operated metal-to-metal band brakes are arranged alongside those operated by hand. The cooling water for the engine is circulated through a honeycomb radiator in front by a direct driven pump of the gear-wheel type. The general appearance of the nicely-finished body is well seen in our illustration; the box at the back is so arranged that it can be removed, and it then leaves a flat platform on which luggage can be carried or to which a spider seat can be fixed.

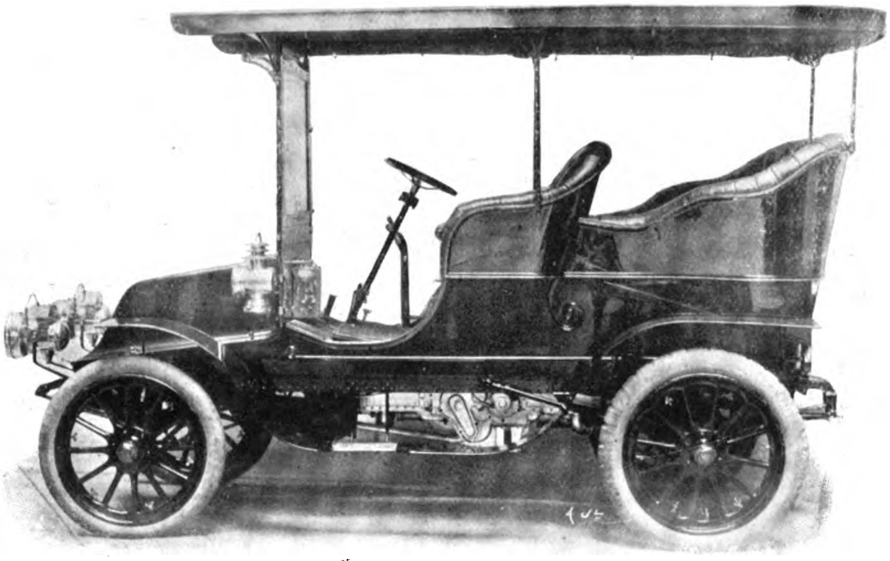

One of the new Alldays Voiturettes fitted with a 3-seated body.

The new Humber models consist of an 8½-h.p. twin-cylinder light car weighing 11 cwt., and intended for four persons. A 6½-h.p. single-cylinder two-seater is also shown. The larger vehicle has a very neat tubular frame, which is carried on long semi-elliptic springs above the tubular front axle and the live-rear-axle. The car in general respects follows the usual live-axle form of construction. Its engine has its two cylinders formed by a single casting, is provided with atmospheric inlet-valves, has a high-tension system of ignition, and is automatically governed on the throttle. It is water cooled, the water being forced by a direct-driven pump of the gear-wheel type, through a radiator forming the front of the bonnet, built up of finned horizontal tubes. The carburettor is of the Longuemare type, and all the levers controlling the speed of the engine are mounted on the steering pillar; the steering wheel is of the single-spoke Humber pattern, so that these levers can be got at from above. The steering gear itself is of the worm type. The main clutch is of the ordinary cone pattern, but has four adjustable springs for holding it in engagement. A flexible coupling is introduced between it and the gear-box, which gives three forward speeds and a reverse, with a direct drive on the top speed. The propeller-shaft has a universal joint at the front end, and a flexible coupling at the back end. No radius rods are employed for connecting the live-axle with the frame, the drive being taken through the side springs. The usual brakes are fitted. The dashboard is fixed to an aluminium bridge, which passes across, and is firmly secured to the frame. The car has a wheel base of 6 ft. 4 in., a track of 3 ft. 10 in., and its wooden wheels are shod with 28 in. by 3 in. pneumatic tyres.

The engine develops 9-b.h.p. at 1,000 revs. per minute, and the car is geared so that it travels at about 27 miles per hour when the engine is running at normal speed and the top gear is in use. The cylinders have a bore of 3⅝ in., and the stroke is 4¼ in. The engine and the rear axle are fed with oil, under pressure, from a lubricator on the dash, the necessary pressure being maintained by the exhaust gases. The back axle runs in plain bearings, and is ring lubricated at each end. The 6½-h.p. vehicle, as also the smaller 5-h.p. model, are, in general respects, of similar design, but are fitted with single-cylinder engines. The larger of these has three speeds and a reverse, is governed automatically, and has the change-speed lever, together with a separate "reverse" lever, arranged at the side. The bore and stroke of the cylinder is 3⅞ and 4 in. respectively, and either wooden wheels or wire wheels are fitted according to price. The 5-h.p. Humberette has two forward speeds and a reverse, which are operated from levers on the steering pillar. The wheel base is 5 ft. 3 in., the track 3 ft. 6 in., and the wire wheels are shod with 28 by 2½ in. pneumatics.

The Swift voiturettes are made in two sizes, both of which are of the live-axle type and have a sliding type of change-speed-gear, giving a direct-through-drive on the top speed. The larger model has an armoured wood frame for supporting the 10-h.p. Aster twin-cylinder engine and the gear-box. An internal cone-clutch is used, and a universal-joint is fitted on the front end only of the propeller-shaft. The three forward-speeds and a reverse are operated by a single side-lever, which has a safety-catch for the "reverse." Side radius-rods are employed, a metal-to-metal foot-brake is used, and a ratchet and pawl device serves the purpose of a sprag. There are no levers on the steering pillar, the lay-shaft remains stationary when the top-gear is in use, and the normal speed of the engine is 900 revolutions per minute. The smaller car has a single-cylinder De Dion type of engine, which gives about 7-b.h.p., the bore and stroke being, respectively, 90 and 110 mm. This engine is of the Company's own make, and has the circulating pump fixed direct to the crank-chamber. The crank-chamber and the enclosed flywheels are larger than usual. A very neat tubular frame is employed, the tubes of which are filled with wood. Three speeds and a reverse are available, and the lay-shaft is arranged so that it remains stationary when the top gear is in use. The back-axle is provided with ball-bearings, and is connected with the frame by radius-rods at each side. A metal-to-metal foot-brake is provided, and it is operated without disengaging the main-clutch; the hand-lever which applies the side-brakes is, however, inter-connected with the clutch. The speed of the engine is controlled by three hand-levers on the steering-pillar, the steering-gear is of the worm and segment type, and the peculiar feature of the suspension of the body is that it is only fixed direct to the frame at the back, whilst helical springs are introduced between it and the frame in front. A view of this voiturette and of the chassis were given by us last week (p. 210).

The new type of voiturette introduced by Alldays and Onions is of the usual live-axle type, and has a 6½-h.p. single-cylinder engine, a change-speed-gear of the sliding spur-wheel pattern giving three speeds and a reverse with a direct drive on the top-speed, and is either fitted as a two-seater, as illustrated on page 211 last week, or as a neat three-seater, as shown in one of our illustrations this week. It has many good features and is well built.



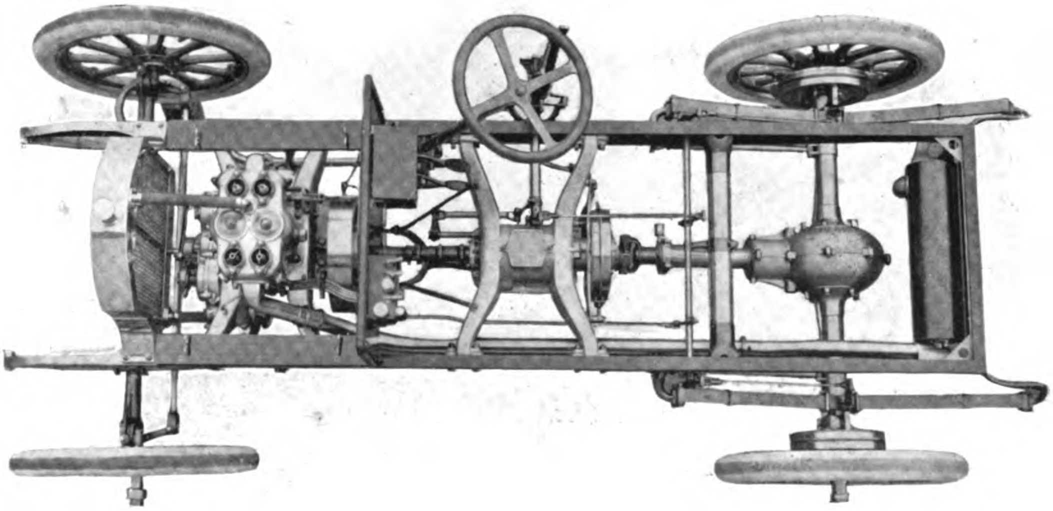
A 1904 20-h.p. Winton Petrol Car.

Amongst the other numerous voiturettes, mention should be made of the Achilles cars built by Messrs. Thompson and Co., which we described in a recent issue, and for which Goodall's Automobile Agency are the London representatives, and of the "No Name" car constructed by the Horley Motor Company. This last-mentioned vehicle was inspected by a large number of visitors, owing largely to its having been put on the market, as a two-seater, at 100 guineas. It is of the usual live-axle type, and is fitted with an 8-h.p. M.M.C. engine. The main frame is of armoured wood, with channel cross-members and a tubular underframe for the engine and the gear-box. Three speeds and "reverse" are available with a direct drive on top speed, and the usual brakes are fitted. The genera appearance of this car, with its wooden wheels and pneumatic tyres, is seen in one of our illustrations.

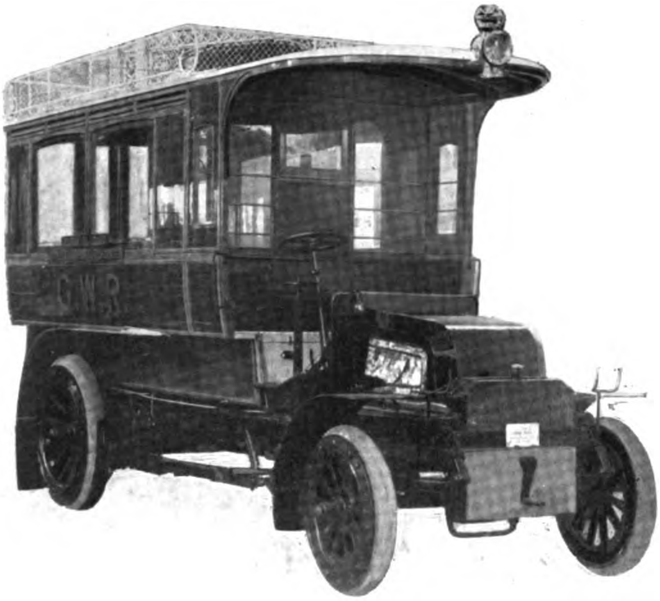
Amongst the exhibitors of Continental and American vehicles which we have not already referred to, mention should be made of the Gladiator stand, on which was shown a 4-cylinder 14-h.p. chassis, together with several finished vehicles of 9 and 12-h.p., having twin-cylinder engines, and of 14 and 18-h.p. having 4-cylinder engines. The 9-h.p. 2-cylinder car is a new model, having mechanical inlet-valves and an automatic carburettor. The standard change-speed-gear gives three forward speeds and a reverse, though provision is made for giving an extra speed if desired; a direct drive is obtained on the top speed. The 14-h.p. type is of similar construction in these respects, and the engine is capable of giving about 22-b.h.p. The 18-h.p. car, shown, had a side-entrance body, and its engine actually developes about 30-b.h.p. Mr. E. H. Lancaster, too, had a good exhibit of Clement cars, ranging from the Bijou model to the 20-h.p. type, and including a landaulette having a 4-cylinder 10-h.p. engine. A 4-cylinder chassis of the most recent live-axle type formed the central attraction of this stall. The Panhard exhibit not only included an assortment of the latest well finished Panhard vehicles, but also three of the 1904 type chassis, two having 4-cylinder engines and the other a 3-cylinder engine. These machines are practically the same as were shown at the Paris Salon, and were dealt with by us in connection with that event. The Roadway Autocar Company's stall was fully representative of the production of the celebrated Mors and Renault firms, the new Mors carburettor being on view, and the latest 14-h.p. Renault chassis with their improved change-speed-gear fitted to it. A large variety of Pipe cars—some of which were equipped with the Jenatzy magnetic clutch—were exhibited by the London Motor Garage Company, and their well-made 20-h.p. chassis was prominent on the stall. These vehicles, too, were referred to by us in our report of the Paris Salon. Those visitors to the Crystal Palace who were unable to attend the Exhibition in Paris, were also afforded an opportunity of examining the excellent cars manufactured by the Georges Richard Company, on the stall of Messrs. Mann and Overton. Several of the 1904 chassis were exposed to view, including their taking little 2-cylinder 8-h.p. model, and the 4-cylinder types, of 16 and 24-h.p. respectively.

The Aries exhibit of the Anglian Motor Company, of Beccles, included a 20-h.p. chain-driven chassis and a 12-h.p. car of a special live-axle type. Both these machines are extremely strongly made and have several interesting features. The larger has a pressed steel main frame, with an underframe carrying the engine and the gear-box, and is mounted on very long side springs. An Aster engine, the cylinders of which have a bore of 95 mm. and a stroke of 140 mm., is employed, in conjunction with an automatic carburettor, and a centrifugal governor acting on the throttle valve. The time of ignition and the normal speed of the engine can be regulated from small hand levers above the steering-wheel, and an accelerator pedal allows the driver to cut the governor out of action when required. An adjustable steering gear is employed, and all the brakes are of the metal-to-metal type. An internal cone clutch is used, and a flexible coupling is introduced between it and the gear-box. The change-speed-gear is operated by a single lever through a specially shaped cam-plate mounted above it. Not only is the cam-plate held in each of its normal working positions by slots in the quadrant engaging the change-speed lever, but holes are also formed in the cam-plate itself for an independent spring catch to hold in direct; a through-drive is obtained on the top speed. The differential gear and the countershaft are enclosed in an entirely distinct casing behind the gear-box, and the power is transmitted to the differential by a flexibly-jointed shaft. The foot-brake is fixed close up behind the gear-box, and the whole of the transmission gear is fitted with ball-bearings. The two-cylinder vehicle is specially noticeable because although it has a live axle, yet this is carried by a stationary forging which is bent round so as to support it at either end, and to carry tubular extensions upon which the road wheels revolve. The wheels themselves are driven by a kind of jaw clutch which causes them to engage with the live portions of the axle.

Samples of the latest twin-cylinder and 4-cylinder Benz chassis were exhibited by Hewetsons, Limited. Both of these are constructed in the same manner, so that the plan view which we give of the former enables



View of the 12-h.p. Benz Parsifal Chassis from above.



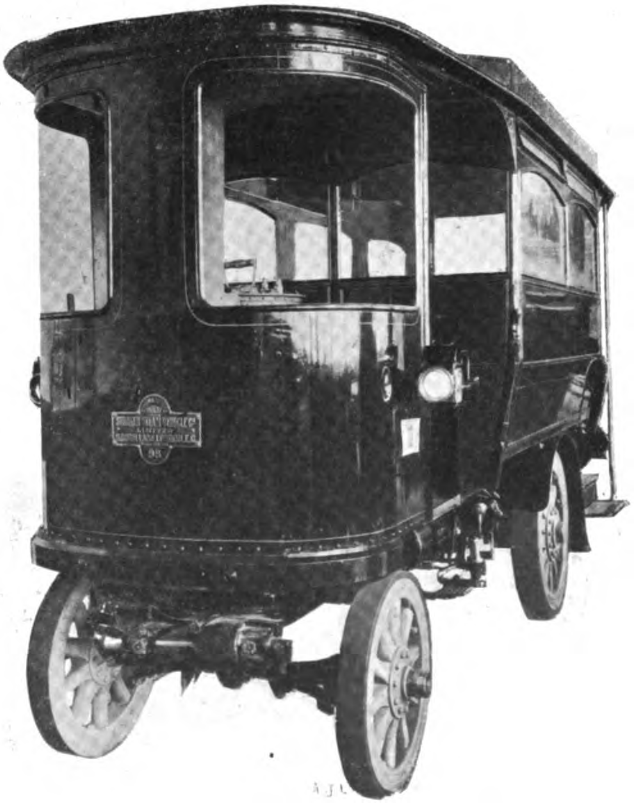
A Milnes-Daimler Petrol 'Bus, built for the Great Western Railway Company for public service in Cornwall.

a good idea to be obtained of both. The main-frame is constructed of pressed steel, and it has one large tubular cross-member, as seen in the illustration. The engine and the gear-box are both fixed direct to it, having long projecting feet formed on them for this purpose. The engine has its mechanically-operated inlet-valves mounted on the opposite side to the exhaust-valves, and the high-tension ignition plugs are placed immediately above the former. Magneto ignition is also fitted on the 4-cylinder chassis, the magneto being gear-driven and lying on one side of the engine, whilst the circulating pump is similarly arranged on the other side. The lift of the inlet-valves is variable and the speed of the engine is controlled by connecting the governor with them, and with an accelerator pedal. No levers of any kind are attached to the steering pillar, since an automatic carburettor is employed and the time of ignition is varied from the dash. The main air supply is drawn from the neighbourhood of the exhaust pipe. The cylinders are cast in pairs, and the wires leading to the igniters are neatly cased in. The main-clutch is of the expanding metal-to-metal type, and the foot-pedal controlling it engages with the accelerator. A flexible coupling is introduced between the clutch and the change-speed-gear, and all the gearing has ball-bearings. The change-speed-gear is so constructed that a direct-through-drive is obtained on the top speed, and the lay-shaft is placed immediately below the direct-through-shaft. All three brakes are of the internal expanding type, and the foot-brake, which is mounted immediately behind the gear-box, has an external friction shoe, which engages with a rib formed around it and acts as a sprag when the shoe is allowed to fall down into place. The power is transmitted to the live-axle by a propeller shaft having a universal joint at its forward end only. The shaft is enclosed in a stationary tube, and the axle is connected with the frame by radius rods at each side. The side-springs are not clipped direct to the stationary portion of the back axle, but are secured to sleeves which are free to turn about it.

The 18-h.p. Windora, shown by Mr. Marples, now has a pressed steel frame and a longer wheel base than before. Its 4-cylinder engine is fitted with mechanical inlet-valves, has an automatic carburettor, and a fan is arranged in the flywheel. The car has a special form of metal clutch, and the differential gear is enclosed in a separate casing from the change-speed-gear, a flexible coupling being introduced between them. The 1904 20-h.p. Winton car was exhibited by the Anglo-American Motor Car Company. This vehicle now has a forced system of lubrication, a stronger crank-shaft, improved clutches in the gear-box, and a new ignition system. The body is wider than before, and the spring suspension is somewhat altered.

Amongst the steam vehicles a very complete exhibit of White steam cars was made, these excellent vehicles being shown with a variety of bodies of different kinds. The chief novelty in the steam line, however, apart from the Keene car, to which we shall refer separately, was the new Serpollet "Simplex" model, to which we called attention in connection with the Paris Salon.

Heavy petrol vehicles were shown by the Milnes-Daimler Company in the form of their well-known lurries for various loads, and of 'buses for public service work. A lurry, too, was exhibited by Messrs. Thornycroft, another by the Cadogan Garage and Motor Company, and a couple of large Durkopp vehicles were also on view. One of these last was a mail van, which we believe is to be used on the Redhill route, and another was a salvage wagon built for the Berlin Fire Brigade. Steam 'buses were exhibited by the Straker Company, along with samples of their latest lurry chassis, which are now made in several different sizes, and have been

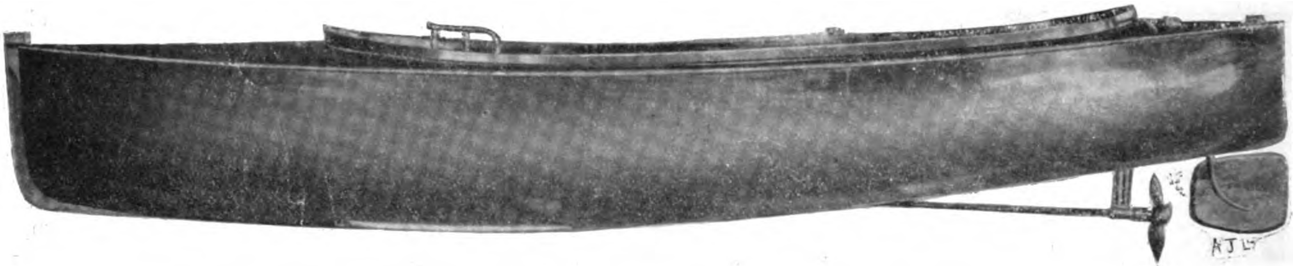


One of the Straker Steam 'Buses.

improved in several important respects since last year. Brief mention has already been made of the other exhibitors of steam lurries proper, but we may mention that one of the Thornycroft vehicles was shown in conjunction with one of the Caravan Restaurant Company's special motor caravans. Most of the well-known makers of these useful heavy lurries were represented, though a few of them, amongst whom the Lancashire Steam Motor Company come to mind, were conspicuous by their absence.

Space does not permit us to say very much about the motor launches, but we were particularly pleased to notice that Messrs. Simpson, Strickland, and Co. were amongst the exhibitors, and brought their fast steam launches before the notice of the automobile public. The Napier engine for this work figured prominently on Messrs. S. F. Edge and Co.'s stall, and Mr. Hutton showed the Brooke petrol launch, of which we give an illustration. This boat has a reversible propeller, and is driven by one of the latest twin-cylinder Brooke engines, which are of thoroughly up-to-date construction, and are well designed. Special mention, too, should be made of the Thornycroft launch exhibit, which included their racing launch, the "Scolopendra," which has a 30-h.p. twin-cylinder engine, and also included a 20-h.p. 4-cylinder motor, fitted with reversing gear having Hele-Shaw clutches and chain-connected starting handle.

[In concluding our Show Report next week, the Tyre exhibits will be dealt with.]



A Petrol Launch fitted with a Twin-Cylinder Brooke Engine. Exhibited by J. E. Hutton, Limited.

THE 20-h.p. HUTTON PETROL ENGINE.

BRIEF mention has already been made of the very neatly-designed petrol engine constructed by Messrs. Willans and Robinson, to the designs of Mr. T. W. Barber, for J. E. Hutton, Limited, some of which have been on view at the Exhibition at the Palace. This engine is shown from the left side in Fig. 1, and the

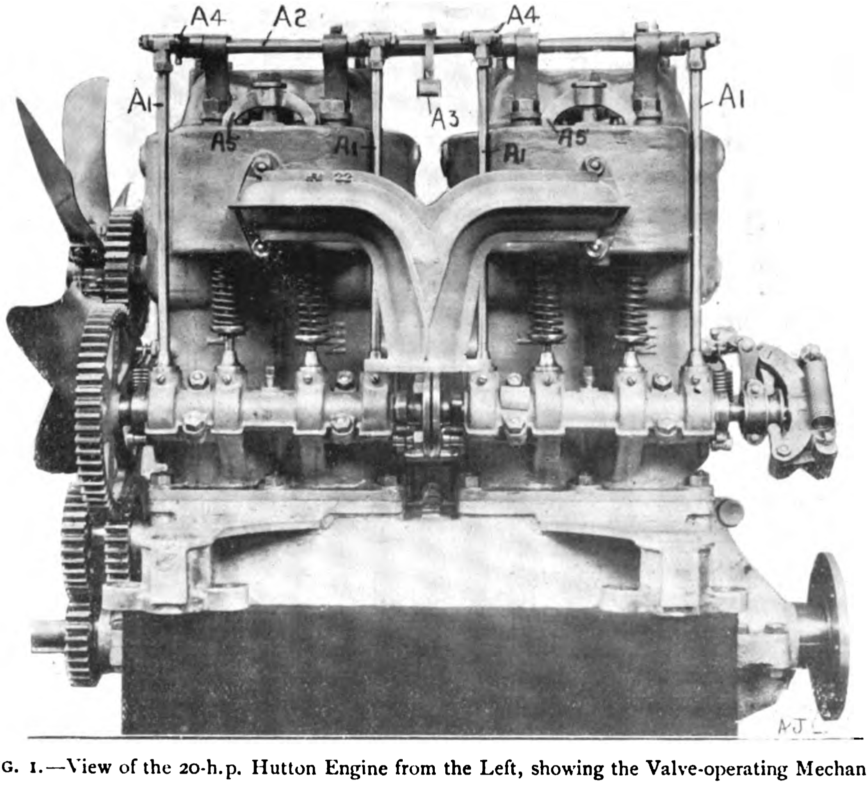


FIG. 1.—View of the 20-h.p. Hutton Engine from the Left, showing the Valve-operating Mechanism.

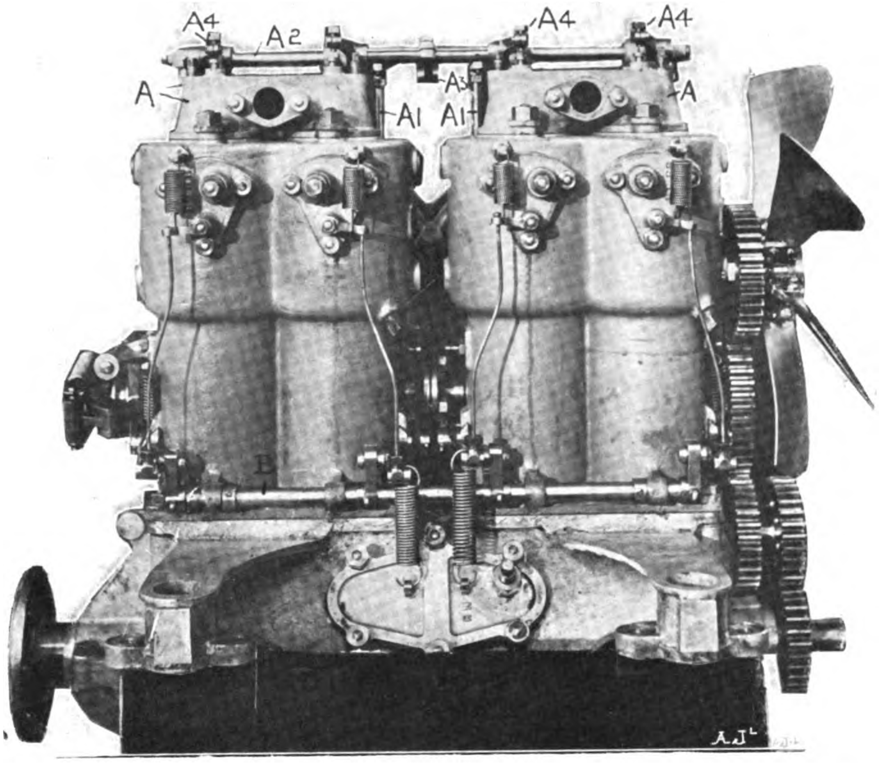


FIG. 2.—View of the 20-h.p. Hutton Engine from the right, showing the Low-Tension Igniters and the "Timing" Mechanism.

right side in Fig. 2. Its most noticeable characteristic is that all twelve cams—operating the inlet-valves, the exhaust-valves, and the igniters—are mounted on one shaft, whilst provision is made for varying both the time of ignition and the lift of the inlet-valves.

The cylinders are cast in pairs, and are fixed to the aluminium crank-chamber in much the usual way. The inlet-valves are placed centrally above the cylinders, and each pair of them is held down by a casting, A, which is secured in place by four nuts. These castings serve to conduct the combustible mixture from the branched induction-pipe to each of the valves, and the valve-spindles project through the top of the castings, so that they can be operated by the rocking levers, A^4, which are fulcrumed on the horizontal shaft, A^2. The shaft, A^2, is carried eccentrically in four bearings as seen, so that when it is turned about its axis by the lever, A^3, it is raised or lowered in relationship to the engine, thus allowing more or less free play between the rocking levers, A^4, and the valve spindles. The rocking levers are at their outer ends connected to vertical push-rods, A^1, which are operated by the cams beneath them, so that by this arrangement the time at which the valves are opened and are closed during the suction strokes of the engine can be varied to regulate the power of the engine.

The exhaust-valves are fitted in the same way as on most vertical engines, in a projecting valve-chamber on one side of the cylinders, and the inspection-plugs above them are held down in pairs by the yokes, A^5, and a single nut for each yoke.

The inlet and exhaust-cams are enclosed in neat casings, the lower parts of which are formed by the cylinder castings. The ignition-cams lie outside these casings, and the cam-shaft on the 4-cylinder engine is made in two pieces, so that the same portions are as applicable for the 2-cylinder engine as for the four; the two shafts are coupled together centrally by flanges and bolts. The ignition-cams act upon fulcrumed levers, which pass across at each end of the cylinder castings to the other side of the engine, and are connected with the low-tension igniters fitting into the cylinder heads on that side. The fulcrum-pins for these four levers are carried by sliding-blocks fitting in guides formed in the cylinder castings, and the sliding-blocks are connected by rods with a rock-shaft, B, which is seen in Fig. 2. The shaft, B, can be rocked by hand in order to vary the time of ignition, and this it does by moving the fulcrums and the levers, so that the former are acted upon by the ignition-cams earlier or later in the cycle of operations.

The cam-shaft is driven from the crank-shaft through an intermediate idle shaft and two pairs of spur-wheels, and this same shaft carries a centrifugal governor at its rear end. The cooling fan for drawing air through a radiator is mounted on one of the cylinder castings and is gear-driven as seen from the spur-wheel on the cam-shaft.

The cylinders have a bore of 90 mm. and the stroke is 120 mm. The normal speed of the engine is 900 revs. per min., and the maximum speed is about 1,500 r.p.m.

* * *

Quo Warranto? "No Motor Cars or Motor Cycles Allowed on this Road, or Tradesmen's Carts propelled by Petroleum, Steam, or Electricity. By order." This reactionary notice appears at the entrance to Kensington Palace Gardens. Who, we wonder, can be the author? It can no longer be "George Ranger," who used to deal in ukases of this description; but we should like to know.

THE ARIEL PETROL CARS.

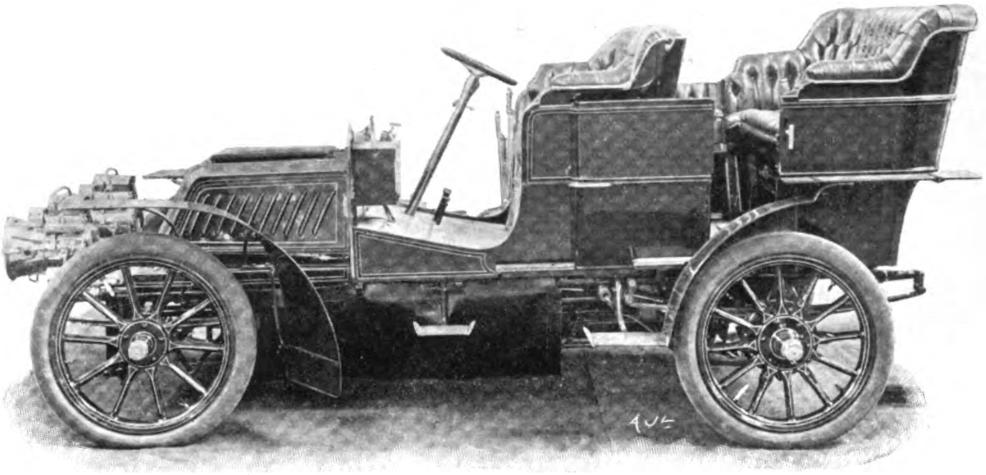


FIG 1.—A 15-h.p. 4-cylinder Ariel Tonneau, with sliding-door side-entrances to the rear seats.

WE have recently referred, in our exhibition report, to the high degree of excellence attained by the Ariel Motor Company, Limited, in the construction of their cars, and to the admiration excited by the examples of English workmanship, material and design brought by them before the notice of the public on their stall. Their vehicles now include three types, having four-cylinder engines, in addition to their latest six-cylinder model, the various engines being respectively of 15–19, 18–22, 20–25, and 30-35-h.p. Considerable attention has also been given to the bodies for use with these standard chassis, so that the company were able to show quite a variety of comfortable and convenient touring carriages to suit the requirements of their customers. One of their latest 15-h.p. touring cars is shown in Fig. 1, and it will be noticed that sliding doors are fitted at each side, between the seats, sos a to enable the passengers to enter the tonneau without stepping off the pavement into the road—this advantage is obtained without materially increasing the length of the chassis or of the wheel-base.

The characteristic features of the Ariel cars are as follows. The main frame is of very strong tubular construction, and provides inner longitudinal members, to which the engine and the gear-box are fixed. The main clutch is mounted on the front end of the first-motion gear-shaft, and is quite independent of the flywheel, to which it is flexibly connected. The change-speed gear does not provide for a direct-through drive, but its first-motion-shaft carries the clutch, as we have said, and the second-motion-shaft, which lies on a lower level and to one side of it, is fitted with the foot operated brake-drum and a ratchet sprag-device, and is connected by a propeller-shaft with the live-rear-axle. The gear-wheels in the box are of large size, and have true epicycloidal teeth, so that the sliding wheels on the second-motion-shaft can be brought more easily into mesh with those on the other shaft, and the gear runs more silently.

The live-rear-axle is of very substantial construction, and is so made that the road wheels revolve upon the stationary portion enclosing the "live" shafts; the weight of the car is not, therefore, taken by the interior bearings. The axle is connected with the frame by radius-rods at each side, for taking the drive, and also by a telescopic connection, containing a spring, which is attached to the casing surrounding the bevel-wheels, and

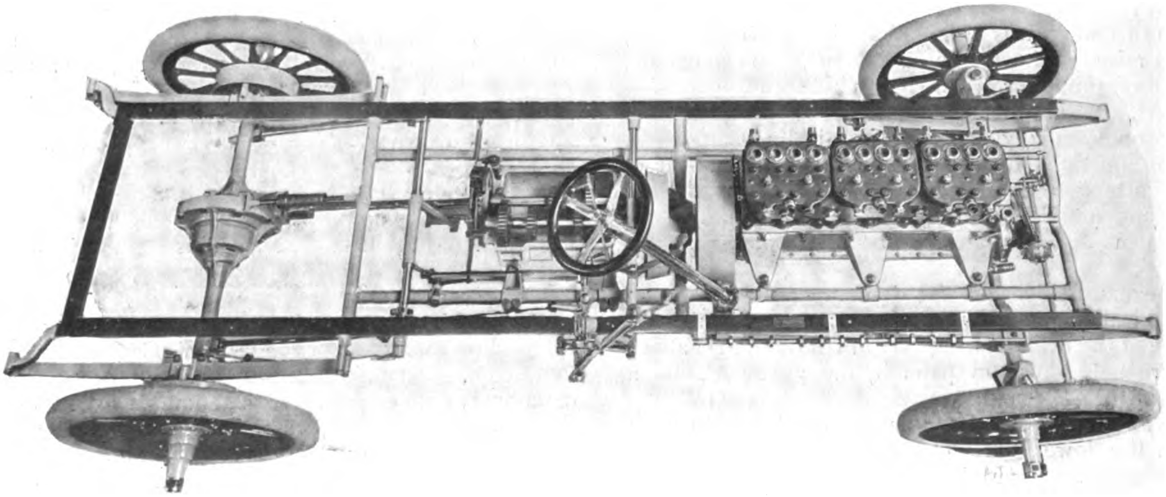


FIG. 2—View of the 30-h.p. 6-cylinder Ariel Chassis

to one of the cross-tubes of the frame, this device relieving the propeller-shaft and the side-springs of torsional strain. All three brakes have metal-to-metal friction surfaces, and the ratchet and pawl device already mentioned takes the place of the ordinary sprag. The steering-gear is of the worm and nut type, and is adjustable. The engine is controlled from above the steering-wheel by very neatly arranged hand-levers, which regulate the lift of the inlet-valves—on those cars which have this device fitted to them—and vary the time of ignition.

The inlet-valves are mechanically operated, and are on most of the engines arranged alongside the exhaust-valve, but on the 20–25-h.p. model, are mounted immediately above them, instead. An automatic carburettor is employed, this being of the ordinary float-feed spray type arranged so that the quantity of auxiliary air finding its way into the induction pipe can be varied. The air is led through a rubber tube, and a hand-controlled shutter from the dash, and there is also a spring loaded valve for the same purpose which is opened automatically, to a greater or a less extent, by the suction in the mixing-chamber.

The two smaller engines have their cylinders cast in pairs, and have inspection plugs fitted above each of the valves. The bore and stroke of the smallest are 3½ in. and 3¾ in. respectively, and the inlet valves on both engines have a constant lift. The 20-h.p. engine has a comparatively short stroke in relationship to the bore, the stroke being 4¼ in. and the bore 4¾ in. The standard car to which this engine is attached has side-brakes of the internal expanding type.

The large 6-cylinder chassis is shown in Fig. 2, and a view of the engine from the left side is given in Fig 3. All six cylinders are formed by one large water jacketed casting, to which the separately jacketed heads, with valve chambers on the one side, are fixed by studs and nuts. There are three of these head castings, one for each pair of cylinders. The water is led into the head-jackets opposite each of the exhaust valves by the pipe fittings A, and is allowed to flow out through a single pipe fitting, A^1, from each jacket on the other side of the engine. The whole of the water is then conducted by a branched pipe through the main jacket around the cylinders themselves, pipe fittings, A^2, being arranged at each end of this large casting for this purpose. The water is circulated by a centrifugal pump, A^3, which is driven by gearing from the engine. The cylinders have a bore of 4 ins, and the stroke is also 4 ins.

The crank-shaft is a solid steel forging, and is supported by four bearings in the crank-chamber, one at each end, and one between each pair of cranks. The crank-pins are arranged so that the three nearest the one end, and the three nearest the other end, are at an angle of 120 deg. from one another; No. 1 is in line with No. 4, No. 2 with No. 5, and No. 3 with No. 6—this crank-shaft is shown diagrammatically, together with other six-cylinder crank-shafts, in connection with our Exhibition article this week.

The single cam-shaft, which operates all the valves, is also formed by a steel forging, the cams and the shaft being cut out of the solid; in Fig. 2, one of these cam-shafts is fixed, for show purposes, to the side member of the main-frame on the right of the engine. The cam-shaft and the gear-wheel driving it are completely enclosed in a portion of the aluminium crank-chamber, and the rocking shaft by which the lift of the inlet valves is varied also lies in the same casing. This shaft carries small levers by which the motion of the cams is transmitted to the push-rods, and when the shaft is turned about its axis its small eccentric bearings cause the levers to move inward or outward, and thus engage with the cams earlier or later in the cycle of operations.

A high-tension system of ignition is employed, the ignition plugs being fitted vertically into the top of each cylinder. The commutator, B, which is used in conjunction with them, is driven by bevel gearing from the front end of the cam-shaft, as seen in Fig. 3. The shaft upon which it is mounted is supported inside a sloping tube, B^1, and the commutator itself, therefore, lies in a very accessible position. Care has been taken to ensure thorough lubrication of the moving parts in the crank-chamber, every bearing receiving its supply of oil automatically.

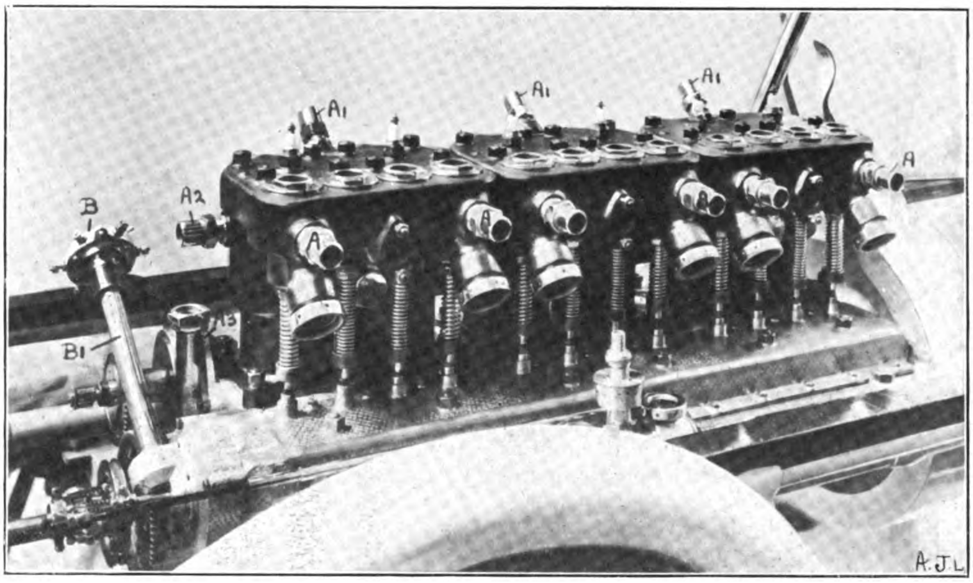
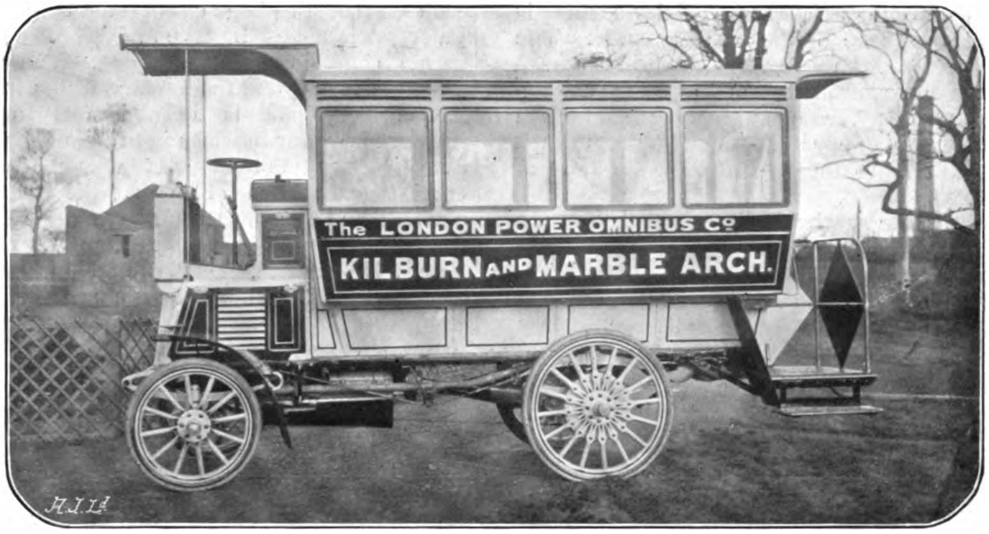


FIG. 3.—The 6-cylinder Ariel Engine, from the left side of the Chassis.

A MOTOR OMNIBUS SERVICE BETWEEN KILBURN AND THE MARBLE ARCH.



One of the New Motor 'Buses for London.

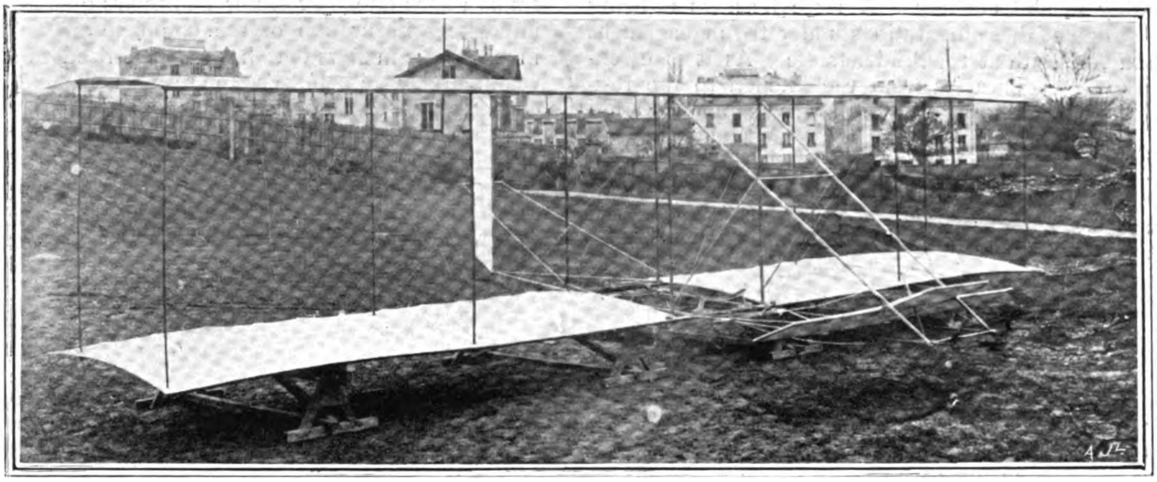
ALL attempts to apply the automobile to public service transport command our sincerest sympathy, and we are, therefore, pleased to be able to chronicle the formation of the London Power Omnibus Company, who have purchased, as a first instalment, from Messrs. Stirling, of Edinburgh, eight omnibuses of improved type, some of which are now running on the road between Brondesbury Station and the Marble Arch, where passengers will be set down close at the Tube railway station—a route on which a similar attempt was made some time previously. It is intended to make the service a frequent one, but as yet only six omnibuses are employed regularly in the service, and a special garage for their accommodation has been built in Salisbury Road. The vehicles at first being used are inside 'buses only. But the windows are completely removable, and if warm and dry weather should ever again be experienced in London, the vehicle can be opened completely, and should prove an exceedingly cool and agreeable means of travelling. At the same time the Company intend also putting larger motor omnibuses, having garden seats on top like the ordinary horse 'bus with which we are all painfully familiar, and capable of carrying 30 passengers at once, on the route. The 'buses, of one of which we give an illustration, provide seating capacity for 14 passengers, and are provided with a standard Stirling engine of 12-b.h.p., running at 750 revs. per min. The main clutch of the vehicle is of metal-to-metal type, and the change-speed-gear provides three forward speeds and a reverse, the top speed being about 12 miles an hour. The governor is adjusted to prevent the engine exceeding a speed which on the top gear will represent 12 miles an hour, so that the driver will not be in a position to go more than that pace. Both the engine and all the gear are contained in air-tight casings, splash lubricating being employed, and the water-cooling is effected by large radiators in front of the driver's seat. One of the main features of the new 'buses is the system of transmission employed, in which a differential countershaft, which may be looked upon as to some extent representing the live-rear-axle in a live-rear-axle car, is arranged parallel to the fixed rear axle of the vehicle, and drives the road wheels by spur-gearing, one spur-wheel being secured to the spokes of each of the driving wheels, corresponding pinions being carried on the end of the differential shaft. Specially powerful brakes are provided for these 'buses, one of the brakes being a powerful double-acting foot-brake, which acts on a water-cooled drum and expanding side-brakes, inside the driving-wheel spur-wheels; either of the brakes is sufficiently powerful to hold the 'bus on the steepest grades. Vertical wheel-steering is employed and the steering-gear has special adjustments and springs for taking up any twisting of the driving wheels. The wheels are shod with solid rubber tyres with 3 in. face, and the whole, when fully loaded, weighs 37 cwt.

That the new 'buses are much more expeditious and pleasant for passengers than ordinary horse omnibuses, it is perhaps superfluous to point out, and considering the avidity with which the travelling public always avails itself of an opportunity for patronising a motor 'bus in preference to any other, there seems every probability that the new service ought to prove successful.

The same manufacturers are providing the War Office with a number of transport wagons, the chassis of which are practically the same as those used in the 'buses which we have described above. The transport wagons are provided with both high and low-tension ignition, and the front steering-wheels, which are 33 in. in diameter, are shod with steel tyres, 7½ in. wide, while the rear wheels, of 36 in. diameter, have similar tyres, 9 in. in width. The three forward speeds of the transport wagons, which are constructed to carry loads of 3 tons, are 2½, 5, and 7½ miles an hour, with the 24-h.p. engines running at their normal speed of 750 revolutions. The bodies are of wood, reinforced with steel, and measure 10 ft. 6 in. in length by 4 ft. 3 in. wide, with side boards of 1 ft. 10 in. in height, which fold down. The total length of the wagons is 16 ft. 5 in., with a wheel base of 9 ft., and a track of 5 ft. 6 in. The wagons, which have been practically tested lately, have, we hear, proved their capacity of carrying up to 7 tons at a maximum speed of 9 miles an hour over a total distance of 42 miles.

M. ARCHDEACON'S AEROPLANE.

We have referred from time to time to the aeroplane which has been constructed for M. Archdeacon at Chalais Meudon, so that we are pleased to be able to provide our readers with several views of the completed machine with which M. Archdeacon and his collaborator, M. Robart, intend commencing a series of experiments at Merlimont, near Berck-sur-Mer. Two of these photographs form our frontispiece, in the lower of which is seen M. Archdeacon himself standing in front of the machine. Various accounts have appeared in the French papers describing this aeroplane as being constructed on the Chanute principle, but from the descriptions given it was obvious that the machine was really a Wright aeroplane, and not a Chanute aeroplane at all. Our readers will see from the photographs that this is the case, and that M. Archdeacon's machine is an exact replique, in all respects, of the machine used in their gliding experiments by the Brothers Wright on the North Carolina coast. In fact it would be difficult to distinguish a photograph of the one machine from a photograph of the other, but as the views we now reproduce enable the details of the construction to be seen with particular clearness, it may be as well to recapitulate the leading features of the machine. As will be observed, it consists of two superposed surfaces slightly convex upwards and covered with silk, the rectangles forming the boundaries of both surfaces being connected by cross members over which the fabric is stretched. The upper and lower surfaces are held apart by vertical struts of ash, and the whole is firmly braced together by cross-connecting wires. The machine is provided with two tails, one in front and the other at the rear, the one at the rear being vertical and designed to control the movements of the apparatus right and left in a horizontal plane, while the forward tail is employed for controlling its rise and fall. The forward tail is mounted in a framework of its own, and is controlled by cords attached to rods projecting above and below through the centre of the surface which forms the tail, both the tails being covered with similar material to that which is employed for the other surfaces of the machine. The cords attached to the front tail pass over a pulley, and by pulling the upper cord in one direction or the other the angle which the tail makes with the horizon can be varied. A somewhat similar means of controlling the rear tail is also adopted. The aeronaut, as will be seen in our frontispiece, assumes a horizontal position, supporting himself on the rest which is visible on this page, and in this position he controls the movements of the machine, not by shifting his position and influencing the position of the centre of gravity, as in the Chanute machine, but by varying the dip of the forward tail. The curvature of the surfaces of the aeroplanes is an interesting feature, the importance of which is perhaps not always so fully recognised as it should be. It has been found experimentally that the lifting power of aeroplanes thus constructed is considerably greater than would be obtained if the surfaces were absolutely flat. This fact has enabled the Wrights, when gliding against a wind, actually to effect slightly rising flights, even though relying only on gravity as a means of propulsion, a feat which would have been absolutely impossible with aeroplanes of flat surface. In fact, with curved surfaces the wind pressure is resolved not merely into an upward or lifting component, but into a forward component as well, assisting the actual forward movement of the machine. This is probably due to the increased whirling or eddy effect which takes place along the front edge of a curved surface as compared with a flat one.



M. Archdeacon's Aeroplane.

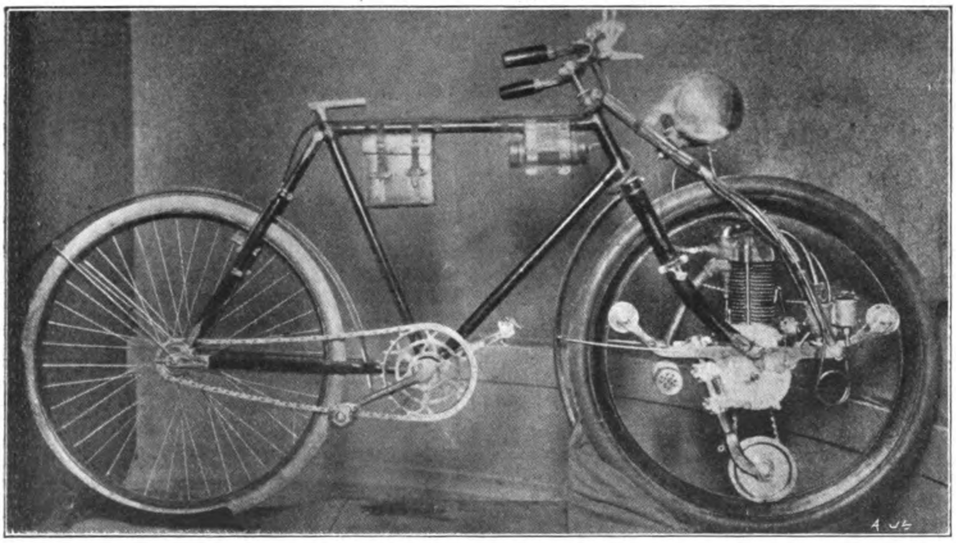
M. Archdeacon is not going to personally risk himself on his new aeroplane, at any rate just at first. The "gap of danger" is to be filled by M. Robart, of Amiens, to whom we have referred before as being associated with M. Archdeacon. M. Robart is understood to have made several previous attempts at gliding flight with other types of machine, and has consequently some practical experience of the management of aeroplanes.

Mr. Orville Wright has sent a letter to another contemporary in which he gives an independent account of the motor-propelled flights which we have already described. There is no substantial difference in the further particulars furnished by Mr. Wright, excepting, perhaps, that he points out that out of the four successful flights two were made by himself and two by his brother, Mr. Wilbur Wright. Mr. Wright states that they intend resuming experiments next summer, and one cannot avoid feeling that he is now fairly confident of the future. For after remarking that the weather was becoming too stormy for further experiments last December, that the flights actually made were merely intended to test the capabilities of the motor-driven aeroplane that when the four flights had demonstrated this, the two brothers packed up their goods and returned home, "knowing that the age of the flying machine had come at last."

THE rapidity with which motor cars move about is being utilised in Berlin in connection with kitchens for providing invalid cookery. A large business is being done at one of these institutions under the management of Frau von Rath at 10, Brüderstrasse. As it is essential to get the delicacies from the kitchen to the residences of the invalids to which they are supplied in the shortest possible time the motor car stud attached to the kitchen is found of great service. We gather that the Berlin police exercise wise discretion, and are not too rigid in enforcing moderate speed in the case of vehicles proceeding on such philanthropic errands.

A GOOD deal of misapprehension appears to have prevailed in regard to the remarks made by Professor Elihu Thomson on æronautics at the dinner given to Professor Langley, so the professor has himself sent an account to the Press of what he really did say. We are glad to find that his remarks laid great stress upon the importance of *gradually learning* the movements and operations required in æroplane flight, which he compared very properly to the difficulties of a child in learning to walk or a man in learning to ride a bicycle. But we are quite unable to endorse the view the professor put forward that the friction of a bird's wings on the air are diminished by the amount of air contained between the feathers, with the corollary that æroplanes would be improved by coating their surfaces with feathers. Some of the largest flying reptiles of past geological ages had no feathers, and in a gas the friction of an irregular surface, however soft, is considerably greater than that of a smooth hard one. Professor Thomson's opinions are an interesting illustration of the complete reversal of view in æronautic matters that has characterised the last few years, largely we believe as the result of the experiments conducted by the Brothers Wright. Formerly, as at the time of Maxim's experiments, it was thought that if a machine could be made capable of flying it would be easy to fly with it. Now it is generally recognised that the difficulty is less in the machine than in the man who is to manage it.

A RAIL-RING BICYCLE.



THE above photograph shows the adoption of the rail-ring principle to a motor bicycle. The front wheel is entirely spokeless and forms the rail-ring. Floating in the centre of the wheel is the petrol motor, the weight of which presses down on the small friction wheel which drives the pneumatic-tyred road wheel by contact with its inner rim. The engine is supported in its place by small guide wheels carried on the end of spring arms arranged so as to reduce the shock from rough roads. The front forks are bolted to the crank-chamber of the motor and are stiffened by an auxiliary pair of stays; otherwise the framework is of the ordinary safety bicycle pattern.

CORRESPONDENCE.

⁂ *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letter intended for insertion, or containing queries.*

THE CLUB AND THE AUTOMOBILE INDUSTRY.

To the Editor of THE AUTOMOTOR JOURNAL.

DEAR SIR,—I have addressed the enclosed letter to the Chairman of the Automobile Club, and shall be obliged if you will be good enough to publish it.

The matter is, in my opinion, of vital importance in the interest of the future development of automobilism, both as a pastime, sport, and industrial undertaking for the benefit and welfare of the British manufacturers, to be passed over lightly by the Press.

I trust, therefore, that you will give the matter your due consideration.

Yours truly,
SHREWSBURY AND TALBOT.

February 20th.

(Enclosure.)

To the Chairman, Automobile Club.

DEAR SIR,—It is my intention to propose at the next General Meeting of the club, on the 10th March next, the following resolutions :—

(1st) That no member of the Automobile Club in the trade, or journalist connected with an automobile journal, be eligible for membership of the committee of the Automobile Club of Great Britain and Ireland, and that the meaning of "Member of the Trade" be settled by the committee of the club.

(2nd.) That the committee of the Automobile Club of Great Britain and Ireland shall have power to appoint sub-committees who shall deal with the matters in which the trade may be interested, such as racing, trials, administration, finance, and Parliamentary questions.

As in all matters connected with any sport or pastime it is the recognised axiom that those who direct such matters should not be interested in any prejudicial manner in such sport or pastime, I have long been of the opinion that any member who may be so described should be excluded from the managing body of the Automobile Club.

For this reason I have not allowed myself to be put in nomination as a member of that committee.

Among the members of the existing committee there have been industry, may have been a matter of necessity, and so far I may say that the non-trade element of the Automobile Club have been able to prevent any serious action being taken against the general interests of automobilism, but now the time has come when the circumstances of the case enables matters to be placed upon a different basis.

My friend, Mr. John Scott Montagu, has proposed for nomination a new committee of the Automobile Club, among the members of which my name is included, but I observe that instead of the trade influence on that committee being lessened, it would be largely increased, giving an absolute majority to the members of the trade.

If such a committee were elected, the whole of the automobile movements would be placed in the hands of interested parties.

The importance of this question is not solely confined to motorists, inasmuch as the general public are very largely affected because of the use to which motors are put, and it is, therefore, imperative that an impartial authority should be deputed to safeguard the interests in Great Britain and Ireland of those interested in the industry, pastime, and sport, as well as those of the general public.

By adopting my proposal the Automobile Club would be administered and be looked up to in the same manner as the Jockey Club, the Marylebone Cricket Club, the Grand National Hunt, and other kindred associations.

As this matter is of such immediate and public importance, with your permission I will send it to the Press.

Yours truly,
THE EARL OF SHREWSBURY AND TALBOT.

February 19th.

(*Copy of reply received from the "Chairman."*)

The Automobile Club,
February 19th, 1904.

DEAR LORD SHREWSBURY,—I am much obliged by your letter of the 18th inst., and shall see that the resolutions are put on the agenda for the general meeting on the 10th of March next.

It will be necessary for you, however, according to the rules, to obtain the signature of 25 members of the club who agree to support your resolutions.

To the Rt. Hon. the Earl of Shrewsbury.

Yours faithfully,
R. W. WALLACE.

LORD SHREWSBURY'S LETTER.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—I have had an opportunity of perusing a copy of the letter which has been sent by Lord Shrewsbury to the chairman of the Automobile Club. Lord Shrewsbury, for some reason or other, has arrived at the conclusion that the Automobile Club cannot continue to be managed with fairness by a committee on which there are representatives of the trade. May I record my opinion that during the five and a half years in which I had the honour of serving as secretary to the Automobile Club, I do not think that there was one occasion on which the members of the trade who were serving on the committee endeavoured to make use of their seat on the committee to further their trade interests. Lord Shrewsbury would do well to go a step further, and to indicate what form of interest is to preclude a man from serving on a committee of the club. Is the club to be deprived of the services on its committee of such eminent gentlemen as Sir John Thornycroft, F.R.S., Mr. John Scott Montagu, M.P., Mr. Arthur Stanley, M.P., Mr. Paris Singer (who is responsible for one third of the rent of the club house), and others?

Will Lord Shrewsbury suggest the names of fifty gentlemen absolutely unconnected with the trade or journals, who are capable of and willing to give the necessary time to carry out the work which has hitherto been done by the club committee and the executive committee?

Does the fact that a man is financially interested in breeding and selling horses preclude him from becoming a Steward of the Jockey Club?

Does the fact that a man is administrating a company which manufactures engines preclude him from serving on the Council of the Institute of Mechanical Engineers?

If there had been a better trade representation present at the meeting of the club committee at which it is alleged that the name and patronage of the club were accorded to the Agricultural Hall Exhibition, might not the authorities have been sufficiently well advised to prevent them from giving, as they have given, the patronage of the club to an Exhibition at which the principal foreign and British manufacturers are precluded from exhibiting?

Is it constitutional or just that, in an institution which was founded for the greater part with the monies, brains, and energies of gentlemen who had, or who have since had, financial interest in automobile businesses, all those who have any financial interest whatever in an automobile undertaking should not be represented by some of their number on the principal committee of the club?

Is there not a danger that, if Lord Shrewsbury carries his proposal, leading amateurs and all the trade members of the club may withdraw from the club, form a Society of Encouragement, and at their first meeting pass a resolution that they do not recognise the club, and will not exhibit or take part in any Exhibition or trial held under its organisation?

I am inclined to think that Mr. Scott Montagu's suggestion that presidents and vice-presidents of the club should not be in any way financially interested in the industry, and that they, with the chairman and vice-chairmen of the club, should form a Supreme Council, is a very happy one. In the event of the chairman of the club committee, or the club committee, or of one hundred of the members of the club, considering that the club is being conducted in the interests of one particular section, the Supreme Council will be asked to give its decision, which will be final and binding on all parties concerned. If this Supreme Council consisted of such men as the Duke of Sutherland, Lord Stanley, Lord Dudley, Lord Onslow, and others of undoubted standing, Lord Shrewsbury and his friends would, I am sure, be quite satisfied with any decision arrived at by it. Lord Shrewsbury was, at one time, a very warm supporter of the Automobile Club. I shall always remember with pleasure the time at which he induced many of his friends to become members of it, with a view to supporting the club's legislative campaign. I hope that now he may see his way to withdraw what appears to me to be an unconstitutional and dangerous proposal, and to adopt Mr. Scott Montagu's proposition as to a Supreme Council.

In conclusion, I should like to point out that the cry has been raised that the rebellion against those who are primarily responsible for the humiliating position in which the club now finds itself in connection with Exhibitions is an attempt by the trade and the automobile journals to secure the control of the club. I hope that no members will be misled by this electioneering cry. They would do well to bear in mind that the cry is raised by those who are responsible for the Exhibition fiasco; that the reform party are anxious to deprive these gentlemen of the opportunity of repeating such a fiasco, and that there has been no attack on the club, but only upon the seats on the committee of those gentlemen who brought about the disaster. Although most of them are personal friends of mine, who have worked loyally, strenuously, and gratuitously to build up the prestige of the club, I look upon the action they have taken wlth reference to the Exhibition question as having wrecked their former work, and that a new committee is necessary to re-elevate the club to the proud position which it held a few months ago.

I am, Sir, yours, &c.,
CLAUDE JOHNSON.

120, St. James's Court, S.W.,
February 23rd.

BRITISH AND FOREIGN CARS.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—The recent Automobile Exhibition held at the Crystal Palace was in some points very disheartening to the genuine British manufacturer, as so many cars, masquerading under honest British names, were made up almost wholly on the Continent or of Continental parts. I think the time has come when every genuine British manufacturer should ask the Automobile Club, or some honest body, to hall mark British goods so that those posing as British manufacture may be put into their proper place.

I think you, Sir, as the Editor of a British paper, should take some steps to find out whether it is correct or not that you have from time to time mentioned well-known names of motor cars as British manufacture when they are nothing of the sort.

In some cases they are British frames with foreign engines, in others foreign frames with English engines. It is only right that the public should know whether they are buying a British car or not, and so far as the Napier is concerned we are prepared to give a clear statutory declaration as to the British or foreign origin of every portion of our cars. We have proved by the manufacture for three consecutive years, every individual part of which was made in this country for the purpose of the Gordon-Bennett Race, that they can successfully be built here, and we wish the credit of British-built vehicles to remain with genuine British builders, and not to be stolen from them by alien parts assembled here.

Yours truly,
S. F. EDGE.

14, New Burlington Street.
February 19th.

P.S.—There was one car in particular, the so-called manufacturers of which have been recently triumphantly heralded throughout the whole Press as a firm of standing, who would be of great assistance in holding up the prestige of Britain. I fail to see it, when they showed a vehicle made up to a very large extent abroad.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—Some kindly disposed competitor of ours has seen fit to start a rumour, at the Crystal Palace Exhibition, regarding our Crossley car, to the effect that this car, with the engines and all the fittings complete, came over from the Continent to Messrs. Crossley's works, and that we had the engine painted with their well-known green, and their stamp put on.

We think, in fairness to ourselves, and in fairness to Messrs. Crossley Bros., an explanation is necessary, because we are sure that this report was circulated owing to the wonderful success that we have had, and the attraction that the Crossley car has caused at the Crystal Palace.

We have much pleasure in publishing the following letter which we have received from the Chairman of Messrs. Crossley, Limited:—

"DEAR SIRS,—We are surprised to hear that there has been any doubt as to our having manufactured the engine shown on the Crossley car. Will you kindly accept this note as a warranty that every bit of the engine was made by us, also the carburettor and the regulators, and all the finished parts shown on our show boards. We also fitted the engines in the cars and assembled the parts purchased by Mr. Critchley from the best known makers.

"It is our intention to lay ourselves out to make the gear and chassis generally except, perhaps, the frames.

"We thank you for having so well exhibited our products.

"Yours faithfully,
"CROSSLEY BROS., LTD.
"(Signed) W. J. CRSOSLEY, Chairman."

The combined energies of Messrs. Crossley Bros., Mr. Jarrott, and Mr. Critchley, it is generally admitted, have produced as fine a car as has ever been put on the English market.

Many people have asked us this week how it is we have got our engine so wonderfully quiet, and at the same time developing such an enormous amount of power for the size of the cylinders. This, we can only add, is owing to the many years of experience Messrs. Crossley have had in building gas engines and wheel cutting, and all credit is due to them for the way in which they have got their engines so beautifully balanced that there is absolutely no vibration no matter at what speed the car is running.

We shall be glad if you will kindly insert this in your next issue, as you will remember, Mr. Editor, on the way back from Manchester we discussed this point of Messrs. Crossley manufacturing the whole of the car, and we told you then that it would be some time before Messrs. Crossley would be able to do so.

Yours faithfully,
For CHARLES JARROTT AND LETTS, LTD.,
WM. LETTS.

45, Great Marlborough Street, W.,
Feb. 22nd.

THE BRITISH AUTOMOBILE INDUSTRY.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—We are surprised to note in your issue of February 20th a reprint of a Paper read by Mr. T. C. Aveling at the Automobile Club, on the British Automobile Industry, 1904, in which estimates are made of the production of various makes of cars.

We would point out that Mr. Aveling requested us to provide him with certain information, which we did not consider it necessary to furnish him with; and as he has made an estimate of the production which is ridiculously wrong in our case, we can only presume that it is equally so in several of the other firms mentioned.

In presenting a Paper of this description before an important assembly like the Automobile Club, it is a great pity that the data given should not be more reliable, as it is very detrimental to the movement in this country, and will no doubt be read by many of our foreign competitors, and reproduced in their journals.

We shall be glad if you will therefore prominently mention in your next issue that the figures given, so far as they relate to the Wolseley Company's business, are totally wrong.

We are, Dear Sir,
Yours faithfully,
For THE WOLSELEY TOOL AND MOTOR CAR COMPANY, LTD.,
T. A. W.

Adderley Park.
Februarv 22nd.

IT is notified that a second borough, viz., the Borough of Mossley, have now withdrawn their application to the Local Government Board for limiting the speed of motor cars within the borough to ten miles an hour. The Borough of Deal was the first one to withdraw their application.

THERE have been several more cases of motorists being fined, either for exceeding the speed limit or driving recklessly, &c. In most of these cases convictions have, as a rule, been registered, while we are glad to be able to record the fact that the fines have generally been moderate, and that the tendency to moderation in this respect, on which we commented last week, still appears to be maintained. But we are rather alarmed at the increasing number of instances in which the police, instead of relying upon actual speed, have obtained conviction by the much more indefinite allocation of driving to the danger of the public. As we pointed out when the provisions of the Bill were under discussion, this is in general a much more dangerous charge to the motorist, and we would suggest widespread combination among automobilists and a general determination to fight cases in which they are charged in this way. Should summonses under this section of the Act become generally successful, it will practically mean that motorists are to be fined whenever a police constable pleases.

REVIEWS OF BOOKS.

"The Ingoldsby Country, Literary Landmarks of the Ingoldsby Legends." By Chas. G. Harper. London: Adam and Charles Black.

There are few more popular works in the English language than the Ingoldsby Legends, and hardly a more popular figure than their author, the Rev. R. H. Barham. He possessed, as few writers have done, the faculty of transmitting a vivid impression of his personality to posterity along with his works, and, as Mr. Harper states, Barham was the same genial wit and humorist in life that he appeared in his writings, for they were the spontaneous expression of himself, and his conversation like his pen was pre-eminently successful in transfixing with shafts of airy ridicule all that was ignoble, hypocritical, or pretentious. He was a delightful personality as all who knew him bear witness. Though he was one of our greatest and driest humorists, some of whose epigrams have become immortal in the English language, he was capable of deeper feeling and higher flights, as is evidenced by his quaintly mediæval re-incarnation poem, "As I Lay A-Thinking," and some of his lyrics and pieces like "Netley Abbey." Had he given this side of his genius freer rein he might very probably have earned for himself in English literature a position among its greatest names. In any case, his was a charming and attractive character, and to have known him well must have been "a liberal education." The next best thing to knowing him, as our author says, is to know the Ingoldsby country, and this the present work enables us to do with admirable thoroughness. The work is charmingly written throughout, and excellently illustrated, and abounds in picturesque and realistic description. It brings the county of Kent, which was pre-eminently Barham's country, and the adjacent portions of Sussex before us with a vividness that few books of the kind have equalled. And nearly every point mentioned is within the compass of a day's run on an automobile from London. Several of the excursions in the Reliability Trials ran over some of the actual ground. In any case, the book cannot fail to be of interest to all automobilists who have an affection for "Thomas Ingoldsby," and will increase the interest of their excursions through Kent. There are other districts and places mentioned in the Legends which do not lie in those counties, and some notice of these is given in the last chapter, entitled "Some Outlying Ingoldsby Landmarks." These include Netley Abbey and Salisbury Plain. But the Ingoldsby country was wider than this, and occasionally Barham took an excursion on the Continent. Rheims, Clèves, the Rhine, and other places are required to make the work complete. If in future editions Mr. Harper should add these to his chapter on "Some Outlying Ingoldsby Landmarks," it would increase the value of his work and make it of additional interest to such automobilists as take tours on the Continent.

"Ornamental Turning." By T. H. Evans. (Guilbert Pitman, London.)

This is a very attractive little work on a subject in which a good many automobilists are likely to take an interest. It is thoroughly up to date and practical in detail; and, being excellently illustrated, gives an attractive review of the large amount of extremely fascinating ornamental work which can be done with an up-to-date T-cutting and overhead gear lathe.

"Fragments from Continental Journeyings," by A. R. Sennett, Honorary Librarian to the Automobile Club. London: Whittaker and Co.

This book has not much connection with automobilism. As a matter of fact, it is a rambling account of a cycle tour which Mr. Sennett undertook mainly through Switzerland, coming back through Bavaria, a good many years ago. The writer has a light touch and an eye for the picturesque, and, as the work forms a rather good guide book for the actual strips of country with which it deals, it may be useful to automobilists contemplating a similar tour. There are some points of taste on which we differ with Mr. Sennett. Somehow or other it jars upon us to find walks amid the Alps described as "leg stretchers in the Alps." Stretching the legs on a journey irresistibly calls to mind Mr. Squeers, and the special form of this process which he has rendered immortal. And why, oh why, does Mr. Sennett spell "frauleines" like this?

"Willing's Press Guide for 1904." London: Willing & Co., 125, Strand. (1*s.*)

This year's issue of "Willing's Press Guide" is the same compendious and useful volume of reference that it always has been, and is, as usual, brought thoroughly up to date. All important particulars of every newspaper and magazine published in the United Kingdom can be ascertained at once by reference to its pages, and it even includes such recent publications as the *Daily Paper*. The general newspapers are printed in black capitals, trade journals and magazines in blackletter, and annuals and other publications in italics, and a wonderfully comprehensive list of Continental newspapers is included.

Mr. O. C. Selbach advises us that, owing to the rapid expansion and development of his business, he has found it advisable to convert it into a limited liability company, with a capital of £80,000, under the style of "Selbach, Limited." There will be no change in the management, which will remain as hitherto under the personal supervision and control of Mr. O. C. Selbach.

Mons. Georges Prade has been making some practical tests with the new Truffault anti-shock device which was illustrated in the Journal on January 16th, page 63, as fitted to a Peugeot car. According to his account the anti-shock mechanism is particularly efficacious when travelling over the terrible *pavé* (in German appropriately *steindam*) with which the main streets of so many French towns and villages are unfortunately cursed. The effect was highly satisfactory, though, of course, as Mons. Georges Prade points out, to bring out the full value of the invention really shocking road is required, scarcely any advantage being perceptible when a road is only moderately bad. When, however, a really seriously jolty road is encountered, such as is provided in specially fine quality by *pavé*, then the better the springs of the car are, in the absence of something producing a damping effect, the more violent will be the jolting up and down to which the passengers are subjected. It is in taking off what may be called the extra jump at the end of the movement of a spring when subjected to exceptionally violent jolting, that the particular merit of the Truffault device is displayed.

CLUB DOINGS.

Gloucestershire Automobile Club.—At a general meeting of the Cheltenham and Gloucestershire Automobile Club, held on the 18th inst., it was resolved to change the name of the club to the title which appears at the head of this paragraph. At the same meeting it was announced that the club had adopted Affiliation Scheme No. 2 with the A.C.G.B.I. For the coming season all the neighbouring automobile clubs have been invited to attend combined meets during the year, and it is hoped that these meetings will form a very important feature of 1904. On March 30th a lecture is to be delivered at the Victoria Rooms, Cheltenham, by Mr. J. Roebuck, of London, when motoring will be dealt with in a popular manner, and illustrated with limelight views.

Upon the proposal of Mr. Dale, seconded by Mr. A. G. Sanders, the following resolution was passed:—"That this club offers its heartiest thanks to the Reading Automobile Club for the services rendered to automobilism in the efforts which have been made to secure that necessary unanimity without which their best interests cannot be secured." It was also agreed to send a protest to the Local Government Board against the proposal of the Corporation of Newport, Mon., to restrict the speed of motor cars in their borough to 10 miles an hour. In this it was pointed out that the Corporation in question can hardly have grasped the immense power which the police have under the Motor Car Act of 1903 in preventing furious driving, nor the protection afforded to the public by Section 1 of the Act, or they would not have troubled to resort to a measure which they dare not apply to tramcars or any other mode of travelling upon the highway.

North-East Lancashire Automobile Club.—Mr. W. Livesey, of Blackburn, presided at the annual meeting of this club, which was held on Monday of this week, at Blackburn. Mr. Walmsley, the Hon. Secretary, who announced his resignation at the annual dinner held the previous week, was induced to reconsider his decision and remain in office for another year subject to assistance being given him, which was at once proffered by Mr. Arthur Birtwhistle and accepted, who will therefore now act as joint Hon. Secretary and Treasurer. Messrs. Charles Jarrott and W. H. Hacking were added to the list of the club vice-presidents, and the number of the committee was raised to twelve—Col. Place, Mr. S. Briggs-Bury, Mr. W. Smith, and Mr. James Walmsley being added to the list.

It was determined that club runs should be held once each month during the coming season, and it was announced that already several invitations had been extended by prominent members of the club for visits. A 100-Mile Non-Stop Run is also to be arranged to enable members to test their cars.

Mr. T. Burton subsequently delivered an interesting lecture on "Electric Ignition," which was thoroughly appreciated by the members present.

UNDER the chairmanship of Mr. J. Crowther, who has also been elected a Vice-President of the Yorkshire Automobile Club, the Huddersfield Centre of the Y.A.C. has now been inaugurated. The Hon. Secretary is Mr. Gordon Learoyd. The new centre is entirely self-governing, but at the same time will participate in all the privileges of the Y.A.C. About fifty new members have already been enrolled.

There are few aeronauts in this country with a wider or more lengthy experience than Mr. C. F. Pollock, and his paper before the Automobile Club on Ballooning, read last week, very naturally proved highly attractive to all interested in aeronautics. Mr. Pollock dealt mainly with his own personal experiences, which were varied and entertaining, though he began with a short historical review, giving the main dates in regard to balloon progress, commencing with the first Montgolfier hot-air balloon of 1783, dealing with the monster Nassau balloon, a burlesque account of which appears, it will be remembered, in the Ingoldsby Legends, and passing on to the balloon exploits of the siege of Paris and the crossing of the channel by Colonel Burnaby in 1882, and by Mr. Simmonds later in the same year, and again in the following year. Mr. Pollock's paper contained some amusing reminiscences of the motor car balloon hunts of the immediate past, and concluded with some suggestive views on the prospects of aerial navigation generally. It is important to find so experienced an aeronaut firmly convinced that the future of aerial navigation does not lie with machines of the navigable balloon type, though he admits that the only practical ascents yet made have been with machines on this principle. His view is that to drive a cigar-shaped balloon through the air at anything like 30 miles an hour, which would be required in order to attain a speed of 10 miles over the ground against a 20-mile breeze, would put a pressure on the gas bag that would be almost certain ultimately to buckle it up. Mr. Pollock does not agree with the Count de la Vaux that the spherical shape provided with propellers is the best form for navigable balloons, nor does he look forward to anything practicable being done in the way of seriously deflecting the course of an ordinary balloon by trail ropes or similar appliances. The history of the heavier-than-air machines, however, hardly bears out Mr. Pollock's statement that no machines of this type, excepting Mr. Maxim's airship, have ever actually flown.

RACES, RECORDS, AND TRIALS.

Classing for Motor Boats.—A summary of the limits of over-all length in metres, and cylinder capacity for each class of motor boat, as issued for the Monaco motor boat races in April, the A.C. of France, and the Yacht Club of France respectively, has been made by *L'Auto*, as under. These measurements were agreed to by the two latter bodies last month:—

I.—CRUISERS.—*Length of Hull and corresponding Cylinder Capacity.*

	1	2	3	4
Monaco ...	6·50 m. and 2·5 lit.	8 m. and 3·75 lit.	12 m. and 7·50 lit.	18 m. and 15 lit.
A. C. F. ...	6·50 m. and 17 h.p.	8 m. and 26 h.p.	12 m. and 53 h.p.	18 m. and 106 h.p.
Y. C. F. ...	6·50 m. and 12 h.p.	8 m. and 16 h.p.	12 m. and 32 h.p.	18 m. and 64 h.p.

RACERS.

	1	2	3	4
Monaco ...	no class.	8 m. and 7·50 lit.	12 m. and 15 lit.	18 m. and 30 lit.
A. C. F. ...	6·50 m.	8 m. and no limit.	12 m. and no limit.	18 m. and no limit.
Y. C. F. ...	6·50 m.	8 m. and no limit.	12 m. and no limit.	18 m. and no limit.

FOR the date of the Industrial Vehicle Trials, under the auspices of the A.C. of France, August 22nd to September 4th has been selected. Last year, it will be remembered, very few entries were received for this event, and it was determined to vary the conditions in 1904 under which the trials were run. It has now been decided that there will be three series of trials, viz.:—

1. Industrial vehicles. These will be divided into two classes, viz.:—Class A, vehicles for rapid service carrying a useful load of from 750 kilogs. to 2 tons; Class B, vehicles for handling goods amounting to over 2 tons useful load.
2. Electric touring carriages, Class C.

Class A will cover an average of 130 kiloms., and Classes B and C, 65 to 70 kiloms. per day. Vehicles in Class C will re-charge daily at the end of the run.

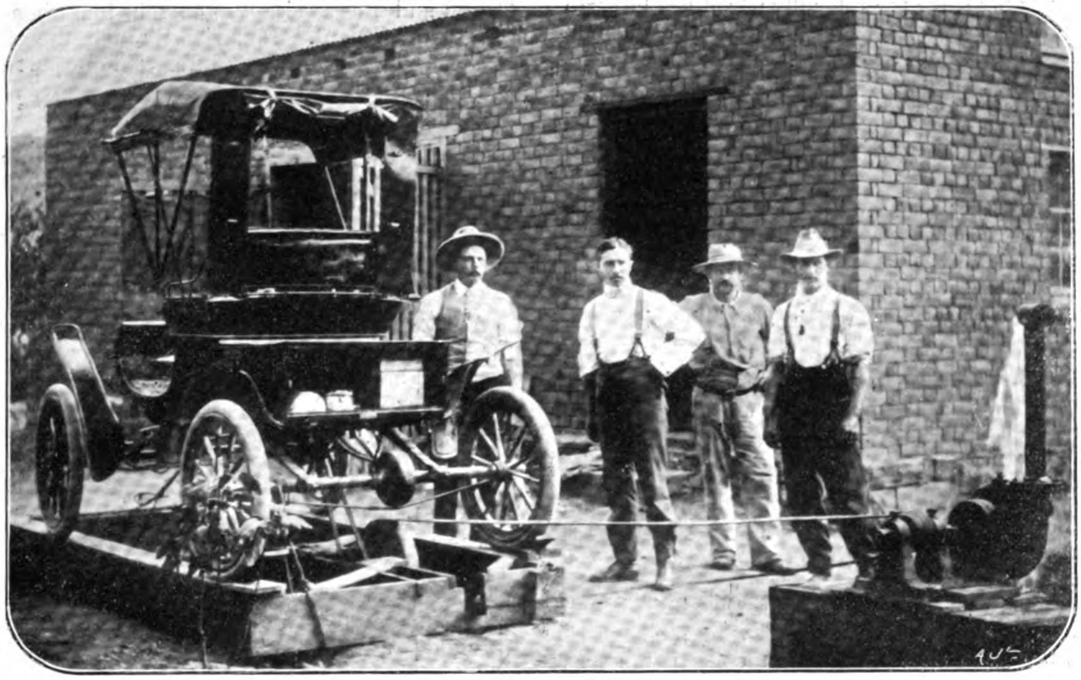
3. During the first two trials there will be tests made of recording apparatus for (1) measuring the distance covered, and (2) for recording the speed at which the vehicles are travelling.

In order to make the trials attractive and bring in a number of entries, different routes will be selected daily throughout the country, and at each stopping place exhibitions and fêtes are to be arranged locally. The route will be from Paris to Rheims, Mezieres, Valenciennes, Lille, Arras, Amiens, Rouen, and back to Paris.

Herkomer Cup. — The competition for the Cup offered last year by Professor Hubert Von Herkomer is announced to take place for the first time this year in August. It will be entirely confined to tourist vehicles, and the donor specifies that the first contest shall take place at Munich under the auspices of the A.C. of Bavaria. The second is to take place in Great Britain, and every subsequent contest in the country of and under the direction of the club holding the trophy. The clubs qualified to take part in the competition are divided into two groups, viz., Group 1, the A.C.'s of America, Great Britain, France, and Austria; Group 2, the A.C.'s of Bavaria, Belgium, Denmark, Germany, Italy, Holland, Russia, and Switzerland. Clubs in Group 1 may enter up to 16 vehicles, and in Group 2 up to 8 vehicles. In the event of less than 40 vehicles being entered, it will rest with the Bavarian Club to decide whether the contest is to be held or not. The entry fee per car is £25, and entries must be received before May 1st this year at the Bavarian Club, Sunnenstrasse 22, Munich. At a treble entrance fee entries will be received up to July 1st. Clubs entering 8 cars will have the right of appointing one representative to the Central Committee.

Competing vehicles must be entirely constructed, in certain respects, in the country which they represent. These parts include the refrigerator, motor, chassis, steering-gear, and carriage work. Exception is made in regard to tyres. No manufacturer may enter more than two vehicles. The Trial will be one of reliance and durability and reserved for tourist vehicles, and no note will be taken of high speeds except for special speed tests over a measured distance and on certain hill-climbs. These tests will be divided into categories, viz., for vehicles up to (1) 15-h.p., (2) 15 to 30-h.p., (3) over 30-h.p. The trials will be in four divisions, viz., (1) concours d'elegance, 3 days; (2) running on the road, 3 days; (3) fuel consumption, brake trials, and hill tests, 1 day; (4) kilometre speed tests and standing start and "standing finish" trials, 1 day.

Competing vehicles must be exhibited for three days at a special exhibition after the Trials. Competing cars will be required to show an average speed of not less than 25 kiloms. per hour and cover not less than 300 kiloms. per day, and each car must carry at least 250 kilogs. useful weight, including extras, accessories, baggage and passengers. Possibly also consumption tests will be made to ascertain the distance each car can run with one litre of benzine or alcohol.



In out-of-the-way districts where a cheap and convenient source of power is occasionally required, the automobile can be applied for many other purposes than that for which it is primarily designed. Our illustration, sent us by our special South African correspondent, shows an Oldsmobile Car on a farm at Beaufort West, in Cape Colony, arranged for pumping. The car is mounted on a wooden frame which carries a shaft on which are arranged a sprocket wheel and a pulley. The chain has been disconnected from the differential and run over the sprocket wheel on this shaft, while a belt from the pulley drives the artesian-well pump, shown on the right of the illustration. The same arrangement enables the Oldsmobile Car to be employed for driving a cream separator, a sheep shearing machine, and for various other purposes, though of course the main use to which it is put is the more legitimate one of transporting its energetic owner over the district for the rough roads and tracks. In fact a large business is being done out in Cape Colony with these useful little vehicles by the Raleigh Cycle Company (Messrs. White, Ryan and Co.) whose manager, Mr. H. Loton, we and our correspondent have to thank for the photograph.

In the Coupe Sneyden, which was run in Algeria on Sunday last, Baron J. de Crawhez secured the cup, in the time of 32 secs. for the kilometre, with a 70-h.p. Panhard. The kilometre race for tourist vehicles was secured by De Bellemare on a 14-h.p. Renault in 57⅘ secs.

Saturday, June 11th, has been selected this year for the automobile races at the Raneligh Club.

Thirty-four entries were received for the Anti-Skid Trials at Versailles, which were announced to commence on Wednesday of this week, terminating on Sunday, the 28th inst.

May 8 has been selected for the Exelberg Hill climb which is organised under the auspices of the Austrian Automobile Club. The distance over which the competition will be run is 4·20 kiloms.

Next week the Criterium of Consumption of *L'Auto* takes place on March 3rd, 4th, and 5th. Close on 40 entries have been received, one of the latest being from M. Chenier, who has entered a vehicle with which he proposes on the first day to use heavy oil, on the second naphthaline, and on the third a fuel of an entirely novel character, in each case with the same apparatus. Under the rules, however, a record will only be taken of the fuel consumption on the first day so far as "classing" the vehicle is concerned.

In connection with the Calais-Dover Motor Boat Race, which will be run on August 13th, for the Coupe Récopé, for craft using heavy oil for fuel, some discussion has now arisen upon the suggestion that the races on this day, upon the return journey from Dover, and the subsequent handicap race on August 15th, should be started from and end at Boulogne instead of Calais, as it is maintained that the former place possesses many advantages as a starting and returning point over the facilities offered at Calais. The balance of opinion appears to be in favour of Boulogne.

GORDON-BENNETT ITEMS.

In the event of the negotiations terminating successfully for running the British Eliminating Trials in the Isle of Man, in all probability it will be possible under the same arrangements to hold regular racing events each year. The unique position of the Isle of Man authorities in being able to make special laws of their own will probably solve the difficulty which has hitherto arisen in this respect, and at the same time be a source of splendid revenue to this go-ahead portion of His Majesty's domain.

With regard to the German Eliminating Trials, propositions are now being put forward to hold the long-distance run in Schleswig-Holstein instead of Hanover or Westphalia.

The tests for the American cars, which commence on April 15th by a complete examination of the cars at New York, will probably include some speed trials on the Ormonde Beach.

The Opel Darracq cars, which are being built at Russelsheim for the Gordon-Bennett Race, are to have a horse-power of approximately 90-h.p. The cylinders are to be completely separated from one another, and the crank-shafts will have bearings between each cylinder. The crank-shafts are of special nickel steel, manufactured by Krupp and Co., of Essen. All the valves are positively actuated, and a cooler of the beehive type is to be employed. Magneto ignition is adopted, and the chassis is of stamped steel throughout, being also the work of the celebrated Essen firm.

A programme of an elaborate nature has been issued by the A.C. of France in connection with their tourist excursion, which they are running in conjunction with the German Automobile Club for witnessing the great race and making a tour through certain portions of Germany at the same time. None but actual members of these clubs can participate, and the only ladies admitted must be their immediate relatives, and every permit to join the caravan will be of a strictly personal character. The entrance fee up to May 10th for each car will be 200 francs, and for each person joining the tour 50 francs. A maximum number of 50 cars only will be allowed to join. A start will be made on June 13th, and Homburg reached on the 15th, a night being spent at Rheims and at Trèves. The return journey will commence on June 21st, Paris being again reached on June 28th, the main towns taken en route being Nuremberg, Stuttgart, Baden, Triberg, Fribourg, &c. In addition, extra excursions are mapped out for Coblenz, Heidelberg, Darmstatt, &c. The main route is obligatory upon all participants, but the speed and manner of travelling will be a matter of "go as you please." The total cost for the 15 days' excursion, inclusive of garage, food, sleep, &c., is about £37 per person, or £32 if not a car owner.

On Friday of this week a monthly paper on "Ignition" was announced to be read before the Auto Cycle Club by Mr. D. Elyard Brown.

Steps are being taken by the East Ham County Council to raise £5,000 for the purpose of purchasing five motor omnibuses to run in the district.

Mr. A. H. Burnand, A.M.I.M.E., last week gave the first of a series of lectures at the Hartley University College, Southampton, on "Petrol and Gas Motors."

The electromobile industry has found a new recruit in the Silvertown Company, which is, we understand, intending to take up the manufacture and sale of electric vehicles.

A motor car service is proposed to be run between Cardiff and Blackweir, Whitchurch, Llanishen, Llandaff, and Llandaff Yard. If carried through the scheme will be in the hands of the South Wales Transport Company, Limited.

His Royal Highness the Prince of Wales, who has for the last year been in the habit of driving a 22-h.p. Daimler, has now, we understand, ordered a 28-36-h.p. Daimler chassis, and intends having the phæton body of his former car transferred to the new vehicle.

A lantern lecture of considerable interest to the novice was given by Mr. C. A. Edbrooke before the Bristol Bicycle and Motor Club last week, when the lecturer gave a very lucid description of the single cylinder motor cycle engine, carburettor, and electric ignition arrangements.

The Lanchester Engine Company, Limited, point out to us that Mr. T. C. Aveling in his Paper on the British Automobile Industry, of which we gave an excerpt last week, wrongly described their company as the "Manchester," when referring to the progress which this company had made.

The extent to which the motor vehicle is being utilised for practical purposes in the army is well illustrated in the case of the naval review that recently took place before His Majesty the King at Portsmouth. During the manœuvres a motor car fitted with a Maxim gun took part in the operations, and gave evidence of the perfectly successful manner in which this arm can be mounted and worked on a motor vehicle. The car to which it was fitted is a 12-h.p. Wolseley car with non-slipping back tyres and the Maxim gun provided with ordinary screen was mounted on the front seat.

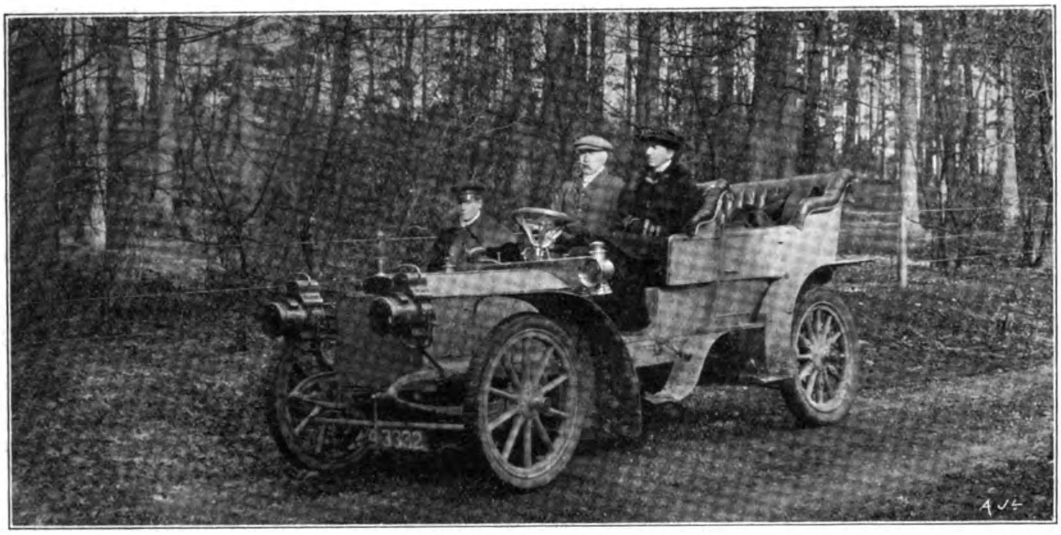
One would have rather expected that a Company like the Edison and Swan Lamp Company would have pinned its faith on electricity. Nevertheless the large van, which many of our readers may have seen about the City distributing lamps and other goods to customers, is a Milnes-Daimler lorry of 9½-h.p. This vehicle has been found by the Ediswan Company exceedingly satisfactory, its daily duties consisting of running in from Ponder's End with a load of lamps to the head office in Queen Street, after which it distributes lamps and other articles to customers about the town, and runs back in the evening with empties and raw material to Ponder's End.

Mr. R. G. Knowles, the well-known comedian, has brought out a book entitled "Stories, Just a Few," the book being dedicated to himself "by his graceful and admiring friend the author." We are reminded of the gentleman whose rooms were full of objects presented to himself by himself as a mark of esteem. Mr. Knowles' book has, of course, a quip in reference to the motor-car. The quip is sound advice at the same time. "When a motor car race is in progress do not cross the track," he says. "You may hurt the feelings of a chauffeur and die before you have time to apologise." If Mr. Knowles ever tires of dedicating works of this description to himself, we might suggest the Marquis de la Rochefoucault (of not pious memory) as a suitable person to whom to inscribe such maxims.

The new Motor Car Act has had the effect, at any rate, of enabling approximately accurate statistics of the number of motor cars in the kingdom to be obtained, and it would certainly appear that the numbers in existence are considerably in excess of what many people may have imagined; in London alone, up to February 17th, 2,356 cars were registered. Altogether, the registration of cars and licensing of drivers has brought in as much as £4,626 to the London County Council. As local licensing authorities are in receipt of considerable sums due to the same source there will probably be less anxiety on the part of the authorities to defray a portion of the rates in inflicting fines on motor car drivers. Perhaps we may attribute to this cause the apparently greater leniency of magistrates since the introduction of the new Act, in spite of the continued prevalence of police traps.

Owing to the action taken by the Hertfordshire Automobile Club, the London and North-Western Railway Company have placed very efficient red tail lamps on the whole of their huge horse-drawn lurries which run regularly between Berkhampstead and Chesham. Several narrow escapes from accidents have occurred during the past winter by the absence of these lights, and it is extremely satisfactory to learn that when the subject was brought before the railway authorities they at once showed a reasonable regard for the rights and safety of other road users, and adopted the suggestions made by the Hertfordshire Club.

The figures in the Board of Trade returns for January, which have been re-arranged upon a new basis, show the steady increase in the imports and the smallness of the exports of motor vehicles and parts. The imports show that 335 motor cars were brought into the country, of the value of £102,866, and parts thereof, £17,906; 51 motor bicycles, value £1,528, and parts thereof, £2,218; making a total of £124,518. The export figures are 55 motor cars (British and Irish), £25,168; parts thereof, £3,470; 78 motor cycles, £3,000; parts thereof, £619. In addition, the figures are given separately for re-exportation of foreign and Colonial cars, which amount to 35 vehicles, value £9,223; parts thereof, £1,011; 7 motor cycles, £249, and parts, £226.



Mr. and Mrs. Ed. Kennard on their new 6-cylinder 18-h.p. Napier Car. Mr. Kennard's enthusiasm for Automobilism is well known, and he is always keen upon trying every novelty introduced. He proposes, we understand, to have this car fitted with the new Palmer Cord Tyres, and it will be extremely interesting to learn later on the results from so experienced a driver.

An organ offered in part payment for a motor car is the kind of barter that appeals to everybody who is anxious to indulge in the new locomotion, but is unfortunately deficient in the means to do so. Organs are much more plentiful than motor cars, and in much less demand. How many organs one would have to give in exchange for a moderately serviceable car it would be difficult, perhaps, to say, but, in a case that recently came into the City of London Court, a gentleman who bought a second-hand Darracq paid for it by £60 in cash, an organ valued at £70, and made up the balance by a bill of exchange. We present the suggestion to Miss Connie Ediss, of the Gaiety, that, possibly, this is "the man she'd like to know." Exchanging mangles for motor cars is not really much more out of the way than taking organs in part payment.

We regret extremely to learn that Mr. S. F. Edge has been unable to shake off his very severe attack of rheumatism, from which he has now been suffering for some considerable time. Not only has he been unable to attend at the Crystal Palace Automobile Show, but he was ordered away on Saturday last to Madeira for a complete change. In all probability, Mr. Edge will have to remain away several weeks, when we shall hope to see him back entirely restored to his wonted health and vigour. In the meantime we understand that Mr. Edge has made all arrangements for everything in connection with his business to be kept in perfectly smooth running order, and that Mr. M S. Napier will personally deal with matters that would in the ordinary way require Mr. Edge's personal attention. For a man of Mr. Edge's active temperament, it must be a great strain having to be absent from business at this moment, which is practically one of the most important periods in the automobile season. In consequence of the enforced absence of Mr. Edge, Mr. E. H. Arnott advises us that he will unfortunately be unable to attend at the Hull Motor Show, which opens on Friday of this week, or at the Edinburgh Show, opening on Monday next, as he originally intended. Mr. Arnott will, however, be glad to hear from agents in Scotland or the North of England on the subject of his announcement in his advertisement last week, as he has a special proposal to make with regard to the Napier and Gladiator agencies.

Our attention has been drawn to the fact that we last week omitted to state in our article describing the new Fiat cars where they could be obtained in this country. The sole English agents for these well-known Italian manufacturers are Fiat Motors, Limited, in whose showrooms at 37, Long Acre, we took the photographs from which our illustrations were made. We might mention that the two Fiat chassis exhibited at the Crystal Palace are the only two 1904 chassis which have, up to the present time, been dispatched from the Turin Works. The Fiat Company are also manufacturing heavy petrol vehicles, and are introducing their motor launches over here.

Six automobile wagons have been ordered by the German Emperor for transporting goods between the Emperor's Berlin residence and Potsdam. These wagons will be particularly attached to the Royal stables.

The German military authorities have been conducting, since the 26th of last month, a number of tests in the Harz Mountains with two motor cars, two motor lorries, and two motor bicycles, to ascertain how far the new locomotion is capable of coping with the difficulties occasioned by snowy roads in a mountainous district.

New premises in the West End, at 395-397, Oxford Street, close to the Bond Street Tube Railway Station, are being opened as show rooms by Messrs. James and Browne, Limited, of King Street, Hammersmith. Ample space will be available for use as a garage.

During the winter considerable inconvenience arises at times from condensation of moisture on the inside of the glasses of goggles and spectacles. Our attention has been drawn to "Photis," a useful preparation which appears to overcome this difficulty by the simple application of a small quantity on the glass. The preparation does not appear in any way to interfere with a clear vision, and should, therefore, be found of use to motorists, particularly during the cold weather. It can, of course, also be applied to the windows of cars with a similar object.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Biddles and Co. (Limited), 62, Humberstone Road, Leicester.—Capital, £2,000 in £1 shares. Object, to acquire the business now carried on at 62, Humberstone Road, and at the factory at the rear of 72 and 74, Curzon Street, both in Leicester, as Biddles and Co., of cycle, motor, and accessory makers, &c. First directors, W. Biddles, Mary J. Biddles, and W. Pratt.

Bridgwater Motor Company (Limited), Eastover, Bridgwater, Somerset.—Capital, £20,000 in £1 shares. Object, to acquire from H. Carver, of Bridgwater, the business of an agent for and dealers in motor cars, cycles, motor cycles, &c. First directors, H. Carver (managing director), S. Austin, and A. Armitage.

Motorists' Tyre Union (Limited).—Capital, £1,000 in 950 ordinary shares of £1 each and 1,000 ordinary "A" shares of 1s. each. Object, to adopt an agreement (the parties to which are not named) to establish and conduct a club, to manufacture, repair, and deal in tyres, motor cars, cycles, and vehicles, &c.

W. J. Peckham (Limited).—Capital, £10,000 in £1 shares. Object, to acquire the business of W. J. Peckham, at 84, Osborn Road, Southsea, at 278-280, Commercial Road, Portsmouth, and at 5, Stoke Road, Gosport, of manufacturers and factors of and dealers in cycles, motor cars, motor cycles, motor boats, &c.

Relyante Motor Works (Limited), Blackhorse Lane Works, Walthamstow.—Capital, £100 in £1 shares.

Sheffield Motor Company (Limited).—Capital, £5,000 in £1 shares. Object, to acquire the business of motor car dealers and repairers now carried on by E. H. Hill and H. Hill at Sheffield.

Solent Yacht and Marine Motor Company (Limited).—Capital, £5,000 in £1 shares. Object, to acquire the business carried on by Charles Sibbick and Co. (Limited), at Cowes, of ship, yacht, motor launch, and boat owners and builders, &c. F. W. Livesay is managing director.

James Walmsley and Co. (Limited).—Capital, £20,000 in £1 shares. Object, to acquire the business of a coach and motor car builder and dealer carried on at Guildford Street, Preston, by James Walmsley and Co. First directors, J. Walmsley, J. L. Cross, and H. P. Cross.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published February 18th, 1904.

23,041. G. E. Bennett. Brake mechanism.

Applied for in 1903.

Published February 11th, 1904.

1,097. C. R. Boswell. Motor road vehicles.
1,506. J. A. McMullen. Internal combustion engines.
1,549. W. H. Sewell. Tyres.
1,696. A. G. Melhuish. Internal combustion engines.
6,074. J. M. MacLulich. Pneumatic tyres.
6,306. A. G. Melhuish. Internal combustion engines.
6,316. A. Hertz. Electric ignition.
7,327. C. Brown and others. Float feed spray carburettors.
25,590. E. Ericson. Friction gears.
27,394. The Stirling Company. Steam generators.
27,527. I. J. Foccart. Change-speed and free wheel hub.
28,024. A. Radovanovic. Explosion motors.

Published February 18th, 1904.

1,924. C. F. G. Low. Variable gear.
1,919. A. W. Boon. Driving and gearing mechanism.
2,162. Sir O. J. and A. M. Lodge. Electric ignition apparatus.
2,181. E. Midgley. Non-slipping band for tyres.
2,514. J. L. Heward. Tyres.
2,634. E. C. Pope-Sadler. Tyres and tyre treads for prevention of side-slipping.
4,576. M. E. P. Chaboche. Steam generators.
5,008. E. S. Bond. Motor mechanism.
6,407. Sir J. I. Thornycroft. Carburetting apparatus.
6,759. H. Smith and B. F. Wright. Controlling devices.
6,794. H. Brough. Liquid fuel burners.
8,811. Brown and May (Limited). Automatic ignition and exhaust valve combined.
23,161. R. A. Fliess. Electrically-heated handles and hand wheels.
26,261. C. Bailly. Magneto-electric ignition devices.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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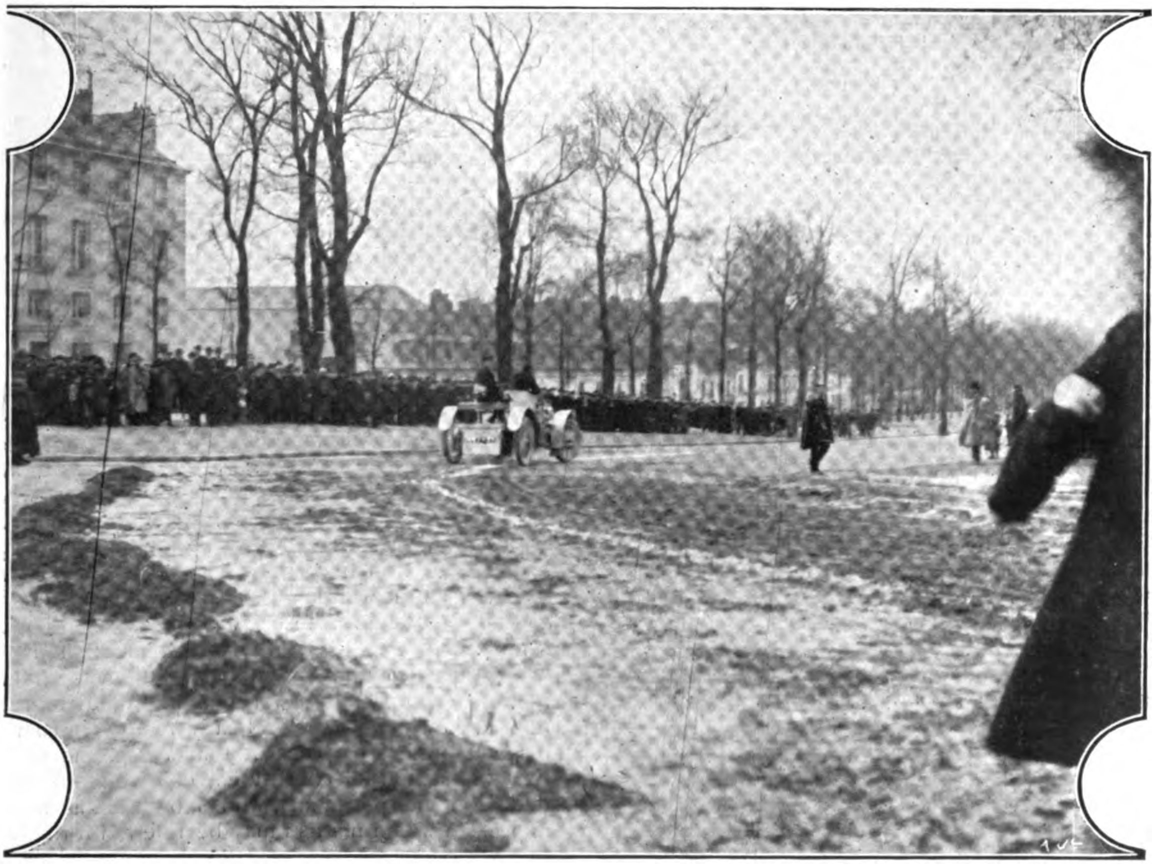

SIDE-SLIP TRIALS IN FRANCE.—The second test of the series of Trials for Non-skids, which was organised by the Automobile Club of Seine-et-Oise, took place at the corner of the Rue de Noailles and L'Avenue de Sceaux. The cars were made to follow a white line (clearly shown in the above photograph), which was marked out on specially-prepared greasy roads. Further particulars of these Trials will be found in another part of this issue.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
*Mar. 3 ...	"Valves and Valve Mechanism of Internal Combustion Engines," by Mr. R. E. Phillips, M.I.M.E. (A.C. Paper).
Mar. 7–12 ...	Manchester Motor Show (St. James's Hall).
Mar. 10 ..	Automobile Club General Meeting.
*Mar. 10 ...	"Continental Touring," by Messrs R. H. Fuller and J. Pennell.
Mar. 15 ...	"Cost, Up-keep, and Care of an Autocar," by Messrs. J. Adam and J. H. Steen (Scottish A.C.).
*Mar. 17 ...	"The Use of the Highway," by Mr. Moresby White, B.L.
Mar. 19–26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24 ...	Smoking Concert.
Mar. 25–30 ...	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May ...	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
June 11 ...	Automobile Races, Ranelagh Club.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Mar.	Paris-Rome (*La France Automobile*).
Mar. 6–12 ...	Buffalo Show.
Mar. 13–20 ...	Cannes Automobile Week.
Mar. 14–19 ...	Boston Show.
Mar. 19–27 ...	Frankfort Exhibition.
Mar. 20–29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26 ...	Washington (U.S.A.) Auto Show.
Apl. 4–9 ...	A.C. America Commercial Vehicle Trials.
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan Motor Boats).
Apl. 18–23 ...	Paris-Nice-Rome.
Apl. 30–May 12	Antwerp Salon.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8–12 ...	A.C. Bordelais Automobile Week.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 14–15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 18–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11 .	Paris–Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup
Aug. 13–14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

A Manifesto.

ON another page is published a manifesto of those members of the Automobile Club who are anxious that the manner in which its affairs are conducted, and its policy directed in future, shall correspond with the sensible and dignified line adopted until comparatively recently. The manifesto gives the outlines of the policy which those who have drawn it up are anxious to see followed, and it will be observed that this policy mainly consists of avoiding the class of mistakes and blunders which have characterised the management of the club's affairs during the past year. In addition, the framers of the manifesto propose a very important and far-reaching reform, to which we have already referred favourably in our columns. They suggest that a supreme council of the club should be constituted, consisting of the president and vice-presidents, who should act as a court of appeal, to whom matters may be referred if the decision of the committee appears to be injudicious. Any member, by securing the adherence of 100 other members of the club, can have the decision of the committee on the point to which he takes exception referred to this supreme council, which will in all probability consist of such men as the Duke of Sutherland, Lord Dudley (the present Lord Lieutenant of Ireland), and Lord Stanley. This supreme council will then decide whether the conclusion arrived at by the committee is to be maintained or to be reversed.

Everyone who has the welfare of the club at heart, and desires to see it once more leading and controlling the movement as it has so effectively and wisely done during the greater period of its existence, will wish that the programme of the manifesto should be carried out, and they can contribute to ensuring this result in a very simple way. The manifesto gives a complete list of 50 members, all of whose names will be found on the voting papers, which have now been sent out to all members of the Automobile Club, and which should be returned by them to the club secretary not later than the 10th of this month, before the meeting, at 5 p.m. All that voters will have to do is to strike their pen through 40 names on their voting paper, which includes the 90 members nominated for the committee. They must see that they do not strike out any of the names put forward in the manifesto, and their duty, as far as voting is concerned, will be done. The voting paper is not to be signed by the voter, and, it should be specially noted, that if either more or less than 50 names are left in the list it will be invalid, and the member making this mistake might as well not have attempted to vote at all.

The names of the members proposed by the signatories of the manifesto are an adequate guarantee that, in the event of their being elected to serve on the committee, the affairs of the club will be managed with dignity and discretion, and without the slightest suggestion of personal interest.

The election of the committee proposed will entail further advantages to the club. Should these members or the greater majority of them be elected, the Duke of Sutherland has expressed his willingness to accept the office of president, Lord Stanley will be willing to act as one of the vice-presidents, and Lord Dudley, the present Lord-Lieutenant of Ireland, has expressed himself in a similar sense.

The acceptance of these posts by noblemen of their position and public influence cannot fail to be beneficial to the club, both by assisting it in commanding the general respect of the public, and in insuring favourable consideration in the highest possible quarters for any schemes or proposals it may put forward. These are advantages which are worth fighting for, and we trust that all our readers who are members of the club will vote in such a way that this end may be assured.

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In order to save trouble to those of our readers who are members of the club, and who desire to vote for the members nominated by the Reform Committee, we give a list of their numbers on the official voting paper. All that they will require to do, therefore, will be to look down the voting paper and leave in the names against these numbers, crossing out all others. The numbers are:—3, 4, 8, 9, 12, 13, 15, 16, 18, 23, 25, 32, 33, 38, 39, 40, 43, 44, 47, 48, 49, 51, 52, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63, 65, 67, 69, 70, 71, 72, 73, 76, 77, 78, 79, 81, 83, 84, 85, 88, 89.

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Objectionable Tactics.

THE executive committee of the club are very anxious about some of the resolutions on the agenda paper. So they are jointly we understand, taking the very questionable step of sending out to the members of the club a large number of proxies in favour of the chairman and two of the vice-chairmen, jointly, with the request that these shall be signed and returned in time for use at the general meeting of the club at the Institution of Mechanical Engineers on the 10th instant by those members who do not propose to attend. We protest against this attempt to run the Automobile Club, and conduct its general meeting as if that meeting were merely an assembly of shareholders in some financial company, where the directors can walk in with a sheaf of proxies under their arms and outvote the public spirited persons who have taken the trouble to attend. Considering also that some of the resolutions on the agenda paper are concerned with the position of the club chairman and the vice-chairmen, the impropriety of the step becomes more apparent. The Hon. John Scott Montagu, although opposed in principle to the introduction of the use of proxies into club affairs, is, in self-defence, demanding on the part of the Reform Committee that if proxies are sent out on behalf of the chairman and vice-chairmen, other proxies shall be sent out, jointly, on behalf of himself, the Hon. Arthur Stanley, Mr. A. F. Bird, and Mr. Henry Norman, M.P. Should our readers who are members of the club receive both sets of proxies, we would strongly recommend all of them who are in favour of the reform of the club, and desire to see it restored to its former commanding position, only to sign proxies on behalf of the Hon. J. Scott Montagu, the Hon. Arthur Stanley, and Messrs. Bird and Norman. Should they only receive proxies on behalf of the chairman and vice-chairmen, they will know that the executive committee has refused to accede to Mr. Scott Montagu's legitimate demand, are utilising the machinery of the club in their own interests, and have declined to put it at the disposal of those who desire reform. In this case we would recommend all members who desire the reform of the club, and who are not able to attend the meeting, to cross out on the proxies sent by the chairman and vice-chairmen all names except that of Mr. Mark Mayhew, one of the vice-chairmen, *initialing the erasures in the margin*, and so return them. Mr. Mark Mayhew is in favour of reform, and in giving him their proxies, progressive members of the club will be leaving their votes in safe hands.

Lord Shrewsbury is also sending out proxies to obtain support for his resolution in favour of restricting the committee to non-trade members of the club, but we trust none of our readers who have perused what we said in regard to the premature nature of his proposal, last week, will accord their support to that proposal by signing proxies in Lord Shrewsbury's favour.

◆ ◆ ◆

Some Resolutions.

SEVERAL resolutions appear on the agenda paper of the general meeting of the Automobile Club. To some of these, such as the resolutions proposed by Lord Shrewsbury and Mr. Scott Montagu, we have already referred, and some of them deal only with matters of domestic interest to the club. But there are two proposals put forward by Mr. Campbell Swinton which are so extraordinary in scope and object, and so specially aimed both against the general and the automobile Press, that we feel it to be our duty to refer to them in some detail. Mr. Swinton proposes:—

> "That it is contrary to all rules of ordinary club etiquette for any member of a club to discuss any of the affairs of his club, and especially the constitution of his committee, in the public Press."

> "That the members of a committee of a club are bound to acquiesce in the decisions of the majority so long as they remain members of the committee. Should they wish to take independent action they must first resign their seats on the committee."

It will be seen that the first of these is designed to prevent all discussion of the affairs of the club on the part of members in the public Press. At the present day the Press is the only vehicle by which discussion can be carried on; at any rate effectively. Views, the promulgation of which can only be effected by button-holing one's friends or enunciating them under a tree in Hyde Park, are not likely to make many converts, so that, to all intents and purposes, the resolution means that the affairs of the Automobile Club must not be discussed by members at all, and would necessitate, if made a rule of the club, that any member who wished to discuss them must at once retire from it. Whether, after having criticised and discussed the policy or actions to which he objects, he could then claim the right to rejoin the club, the resolution fails to state. But, frankly, it is all nonsense. We do not propose to discuss the ethics of the question as far as an ordinary club is concerned. The case of a body like the Automobile Club, which has always represented itself, and continues to do so in its report now issued, as "a Society of Encouragement to an industry which is attaining vast proportions," is altogether different. It is not an ordinary club. Its affairs and proceedings are of public import, and of the greatest possible interest to everyone engaged in the automobile movement, and they must be open to discussion and must be discussed in the public Press. To attempt to rule out all members of the club from such discussion is simply ridiculous. It is almost more than ridiculous when we consider that such discussion has regularly taken place in the club newspaper, and that criticisms are systematically provoked by highly controversial statements in its pages. Nor do we see that the second of Mr. Swinton's resolutions has much more to be said for it than the first. There is no *major premis* from which it can be deduced as a conclusion. If a member of a committee is out-voted on an important matter, why should he refrain from attempting subsequently to ventilate his opinion of the situation or to convert other members of the committee with a view to reversing their decision, and why should he deprive himself by resignation of the chance of voting again on the subject if it again comes up for consideration? If every committee or public body were conducted on these lines it would lead to the elimination from them of almost every sensible member, for only a committee of nonentities is ever as a rule unanimous. The resignation of dissentient members, however, would be particularly absurd in the case of a body like the Automobile Club Committee, in which many of the members of the executive committee also sit on the general committee. For on many questions the executive committee has decided on a definite course of action, only to have their decision very advantageously reversed by the general committee, and if the minority on the executive committee had always acquiesced or resigned, this result could hardly ever have taken place. If a man has views that are worth supporting at all, particularly a man sitting on an important body, whose decisions are bound to affect an important industry, those views are worth fighting for. If he has to resign or keep silence every time he is out-voted, the attempt to manage a body like the Automobile Club by means of a committee might as well be abandoned at once.

The Muse Concludes.

MR. KIPLING has brought his *Daily Mail* series of parodies, or imitations of leading poets, devoted to motor topics to a close. They have raised many a smile, and have provided one more illustration of Mr. Kipling's amazing versatility and command of technique. On the whole, perhaps, they have hardly fulfilled the high promise of the first imitation of Chaucer, which was distinctly delightful. We had hoped for something that would have done justice, even if humorously, to the speed and rush of the automobile, and not have left the late Mr. Henley's "Speed in the name of the Lord" the last word on the subject. Perhaps, too, there are some readers who could have spared the parody on certain fine passages in "In Memoriam," funny though it is, for there are some poems one feels ought to be exempt. In any case, Mr. Kipling would find it a problem to drive by "Lyonesse to Locksley Hall," as all that remains of the sunken country of Lyonesse is the Scilly Islands. We trust, however, that Mr. Kipling's muse will not permanently abandon automobilism. He has made the subject entertaining; we hope soon to see him make it great!

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Another Electioneering Opportunity.

EVERYONE engaged in running an election has learned the lesson of the recent Parliamentary contests, that the most powerful ally a candidate can have is the motor vehicle, and the Chairman of the Joint Municipal Society and Metropolitan division of the National Unionists is sending round a circular asking all supporters of the Unionist cause to place cars at his disposal at the impending municipal election. The Motor Union will, undoubtedly, embrace the opportunity to insist on a definite statement on behalf of the candidate in favour of progressive legislation on the automobile question, before placing cars at his disposal. It is needless to point out to all private owners of cars who are willing to lend them, that they will not be consulting the interests of the movement if they should put their cars at the service of either of the candidates without having previously elicited a definite promise on the all-important question. It would be of considerable advantage to automobilism if, for the next three years at any rate, car-owners would subordinate their political convictions to the interest of the industry in this respect.

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Sergeant Jarrett Day by Day.

SERGEANT JARRETT had two more cases at Guildford last week, which were both again defended by Mr. Firth. One of them the Sergeant lost altogether, and the other was but a Pyrrhic victory, for his victim, Mr. Rodakowski, was only fined 5*s*. It is interesting to find that Sergeant Jarrett altered the tactics adopted in the previous case, and charged Mr. Rodakowski not with exceeding the 20-mile limit, but driving to the public danger. This charge has the advantage of not requiring either timing or confirmation, so that it was not affected by the comical exposure of the eleven defective stop-watches. An amusing feature of the case was that when Mr. Rodakowski was stopped in the first instance, he was informed that he was driving at precisely 25 miles an hour. That he was summoned on the other count is probably due to his having a gear-driven speedometer on the car, to which he called the constable's attention—in our opinion, a mistake in tactics, that resulted in the statement that the people were all just coming out of church and that a number of innocent school children were very nearly run over.

It is an interesting comment on the methods of the Surrey police to learn that, at the time of writing, the letter belonging to Mr. Firth, annexed by the Deputy Chief Constable at the hearing at Woking, has not yet been returned, in spite of an application having been made to the Bench, who, from some incomprehensible reason, decided that they had no jurisdiction in the matter. We have certainly always been of opinion that it was one of the principal functions of Benches of Magistrates to deal with cases of unjustifiable annexation, and that police officials were not above the law. But magistrates are occasionally ignorant of it.

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The Prospects of the Motor 'Bus.

NEVER have we entertained the slightest doubt that the motor 'bus is ultimately destined to prove a successful competitor with tramways, whether propelled by electricity or otherwise. The victory would be to the benefit not only of the automobile movement, but to the general public also. An automobile 'bus service is much more flexible than a tramway system. Its inauguration does not involve the tearing up of the streets, the dedication of wide portions of them to a particular service, and does not necessitate the disfigurement of streets and thoroughfares by the frequently unsightly overhead erections which form the cheapest method of providing the electric trams with their supply of current. The unyielding character of the tram traffic, and its inability to give way to other users of the road, constitute an even more formidable indictment. But these points are outweighed altogether by the most forcible argument which can at the present day be advanced against any system—its enormous costliness. The initial cost, which even on an overhead system is considerable, and in the case of a conduit system is enormous, is now being further increased by the local authorities, who are very properly beginning to demand that where it is proposed to dedicate a large slice of a street or highway to tramway service, the Tramway Company should be prepared to contribute to a compensatory expenditure for widening the thoroughfares. This is now the state of affairs at Brentford, and as we were one of the first journals to put forward the equity of such a course, we are glad that it is at length being followed. Other local and municipal authorities in Slough, in Buckinghamshire, and elsewhere, are coming to take the same view, and the general adoption of this attitude will unquestionably have the effect of stimulating motor 'bus enterprise.

It is satisfactory also to find that Mr. J. L. Pound, one of the directors of the London General Omnibus Company, in his evidence before the Royal Commission on London Traffic, showed that he was fully alive to the importance of the motor 'bus, and hoped that his Company would soon be in possession of a satisfactory vehicle which would enable them largely to dispense with horse traction, and no doubt have the effect of largely diminishing the congestion on London streets. As to the popularity even of the horse 'bus, we agree with Mr. Pound that there could be no doubt whatever. The motor 'bus, wherever introduced, has proved to be more popular still. Mr. Pound would hardly have made such a statement in evidence if his Company were not prepared to adopt his proposals, so we may live in the hope of seeing the cumbersome and unwieldy horse 'bus, which has altered little in the last 20 years, relegated to the scrap heap, and replaced by a neat, commodious, and, above all, rapid motor service.

ELECTION OF THE NEW CLUB COMMITTEE.

Manifesto of the "Reform" Committee.

To Members of the Automobile Club of Great Britain and Ireland.

ON several occasions during the last twelve months the Automobile Club has had its name attached to public letters and undertakings with disastrous effects to the prestige of the club.

These acts have often been contrary to the wish of the club committee and the club members as a whole, and have been brought about by a few gentlemen who, although they have done excellent work for the club in the past, have recently involved it in difficulties which have caused the resignation from the council, committee and club itself of important men, and have also brought its authority into general disrepute.

We consider it, therefore, our duty to ask the members of the club to elect a new committee, who will endeavour to repair the mistakes of the past. We accordingly invite every member of the club to omit to vote for the re-election to the club committee of those who have been responsible for the errors complained of, and to vote in favour of the election in their place of members who in common with us desire to secure reform.

Members are earnestly requested to vote for 50 names—and 50 only.

The following appear to have been nominated for the new club committee by both the old administration and the Reform party, and should certainly be voted for:—

Sir David Salomons, Bart., Chairman of the Foreign Relations Committee; Member of the Committee of the Automobile Club de France; Founder of the Liverpool Self-Propelled Traffic Association.
Sir John Thornycroft, F.R.S., senior partner Messrs. Thornycroft and Son.
Lt.-Col. Mark Mayhew, L.C.C., Vice-Chairman of the Club, 1901, 1902, 1903; Lt.-Col. of Automobile Volunteers.
Col. H. C. L. Holden, R.A., F.R.S., Superintendent of H.M.'s Gun Factory, Woolwich Arsenal; Member of Club Committee, 1901–3.
Major F. Lindsay-Lloyd, R.E., Secretary Mechanical Transport Committee, War Office; Member of Club Committee, 1901-3.
Mr. Alfred Bird, Founder Member of the A.C.G.B.I. Club Committee, 1900–4; Chairman of Races Committee.
Mr. Mervyn O'Gorman, M.I.E.E.; Member of Races Committee, and Judge Irish Contests, 1903.
Mr. E. Keynes Purchase, Hon. Architect of the Club.
Mr. E. R. Pickmere, Town Clerk of Liverpool; late Member Departmental Committee on Highways.
Mr. Hugh Weguelin, Member of the Club Committee, 1901–4; Early Pioneer.
Dr. Boverton Redwood, D.Sc., F.R.S.E., Expert on Petroleum Products; Member of the Club Committee, 1901–4.
Mr. C. D. Rose, M.P., Member of the Parliamentary Committee; Member of the Jockey Club, &c.
Mr. James Ochs, Member of the House Committee, 1903–4.
Mr. Frank Butler, Founder Member of the Club, Member of the Club Committee, and its first Hon. Treasurer.
The Hon. Stuart Bouverie, Director Vickers, Son, and Maxim.
Capt. H. Deasy, late 16th Lancers, Gold Medal Royal Geographical Society, 1903; Messrs. Deasy and Co., Limited.
The Hon. C. S. Rolls, Messrs. C. S. Rolls, Limited; a well-known Automobile Sportsman and Pioneer; Member of Club Committee, 1901–4.
Mr. E. Calthrop, M.I.C.E., Member of the Club Committee; Judge L.S.P.T.A. Trials, 1898, 1899, 1901.
Mr. J. R. Nisbet, late Chairman of Western Section of Scottish Automobile Club.
Mr. Fredric R. Strickland, partner in Messrs. Thornycroft and Son.

Mr. Edward Cozens-Hardy, Judge Automobile Club's Trials; Member Club Committee, 1902–4.
Mr. J. A. Holder, Automobile Sportsman and Amateur Engineer.
Mr. Robt. Todd, Chairman National Cyclist Union and Roads Improvement Association.

The following have been nominated by the old committee for the new committee, through the efforts of the Reform party:—

The Hon. John Scott Montagu, M.P., Chairman of the Parliamentary Automobile Committee; Member of the Local Government Board Departmental Committee on Highways, April to June, 1903; Editor of the *Car Illustrated*; Vice-Chairman of the Automobile Club, 1900, 1901, 1902, 1903.
Mr. George Montagu, M P., existing Club Committee Member; late Private Secretary to President Board of Agriculture, 1900–2, and Local Government Board, 1902–3; Railway Expert Member of Parliamentary Automobile Committee.
Mr. Henry Norman, M.P., existing Club Committee Member; Member of Parliamentary Automobile Committee.
Mr. Paris Singer, Hon. Treasurer, 1900–4, and responsible for one-third of the rent of the Club House.
Mr. Robert E. Phillips, M.I.M.E., Founder Member. Has served on Club Committee 1901–4. Inventor Electrical Timing Apparatus; Judge 1903 Reliability Trials, undertook whole of timekeeping arrangements for the Gordon-Bennett Cup Race.
Mr. Lionel de Rothschild, Club Committee, 1903–4.
Earl Russell, Member of Legislative Committee.
Mr. J. D. Siddeley, Member of Club Committee, 1901–4; Founder Member of Midland Automobile Club, Messrs. Siddeley's Autocar Company.

The following have not been nominated by the old club committee, probably because it is known that they belong to the Reform party:—

Sir Edgar Vincent, K.C.M.G., M.P., has been holder of many Government Appointments; Private Automobilist.
The Hon. Arthur Stanley, M.P., Vice-President Liverpool Self-Propelled Traffic Association, &c.; Member of Parliamentary Automobile Committee; Member of Club Committee until recently, when he resigned from the Club as protest against recent actions.
Sir Wroth Lethbridge, Bart., Private Automobilist.
Mr. Chas. Shaw, M.P., Member of Parliamentary Automobile Committee; Private Automobilist.
Mr. Wilson Noble, M.P., Hastings, 1886–95; Private Automobilist.
Mr. W. J. Bull, M.P., Private Secretary to President Local Government Board; Member of Parliamentary Committee.
Capt. C. Skeffington Smyth, D.S.O., 9th Lancers, Adjutant Motor Volunteers.
Mr. Ashton Jonson, Member of House Committee, 1902–4.
Mr. Stanley Spooner, Editor of THE AUTOMOTOR JOURNAL; well-known Authority on Mechanical Locomotion; Member of Club Committee, 1900–4.
Capt. T. G. Tulloch, R.A., Secretary Explosives Committee of War Office; Automobilist.
Mr. Henry Sturmey, Director of the Duryea Company; one of the Pioneers of Automobilism in England; Member Club Committee, 1900–4.
Mr. F. P. Armstrong, Barrister-at-Law, Automobilist and Writer.
Mr. Frederick R. Simms, Messrs. Simms' Manufacturing Company, Founder and First Vice-Chairman of the Club and President of the Society of Motor Manufacturers and Traders.
Mr. W. H. Astell, Managing Director New Orleans Motor Company; Judge Automobile Club's Reliability Trial, 1902; Member of Races Committee.
Mr. S. F. Edge, Winner Gordon Bennett Cup, 1902; Messrs. S. F. Edge, Limited; Member Club Committee, 1903–4.
Mr. Chas. Jarrott, Winner of the Ardennes Race, 1902; Messrs. Chas. Jarrott and Letts, Limited; Member Club Committee, 1903–4.
Mr. Claude Watney, London Motor Garage Company, and Amateur Motorist.
Mr. Theodore Chambers, Director of the Electromobile Company, Limited; Associate R.M.S.; a Pioneer of the Electric Carriage Industry.
Mr. Claude Johnson, Secretary to the Automobile Club, 1898, 1899, 1900, 1901, 1902, to March, 1903.

All the foregoing names should be voted for.

If such a committee as the above is elected the following gentlemen have consented to serve in the undermentioned capacities:—

His Grace the Duke of Sutherland, K.G., as President.

His Excellency the Earl of Dudley, Lord-Lieutenant of Ireland, as a Vice-President.

The Rt. Hon. Lord Stanley, Postmaster-General, as a Vice-President.

PROGRAMME OF REFORM COMMITTEE.

The following reforms are suggested:—

1. The formation of a Supreme Council composed of the president and vice-presidents (none of whom shall have any financial interest in the automobile industry) and the chairman and three vice-chairmen to the club committee, who shall act as a court of appeal to which members of the club may refer any act of the club committee which they may deem to be against the best interest of the club.

2. That a reasonable and dignified procedure should be taken to settle any differences which exist amongst manufacturers and traders as regards Exhibitions, Shows, Associations, &c., and to re-establish the prestige of the club, which has been so seriously injured owing to the name and patronage of the club having been given to an Exhibition at which the principal British and foreign manufacturers and traders are by their bonds precluded from exhibiting.

The present administration has abandoned the dignified attitude adopted by the club in 1902, when it announced it would not give its patronage to any Exhibition while the industry was divided, and offered the patronage of the club to promoters of both Exhibitions, irrespectively of whether the one or the other might refuse the club's terms, and has thus placed the club in its present humiliating position.

3. That an endeavour should be made to regain the confidence and respect of Parliament, the county councils, and the authorities generally, and to insist that no public announcement shall be made without proper submission to the executive or club committee.

4. The suppression by drastic measures of any reckless and objectionable driving of motor cars by members of the club, and thus to aim at securing the goodwill of other road users and the public at large.

5. So long as the members really desire it, to continue the Automobile Club *Journal*, but to make it rather a private medium of intercommunication amongst members than a controversial public newspaper. We think that it should record facts rather than express opinions, and publish members' letters or comments, irrespective of whether they criticise the club authorities, except they are obviously libellous or objectionable.

6. To improve the facilities for information afforded by the club.

7. To prevent the club from being administered specially in the interests of any particular section of the trade or to suit the fads of any section of amateurs, but to conduct it in the interests of the general body of members and of the movement as a whole.

8. To seek the co-operation of the affiliated clubs in defending the interests of automobilism as a whole, while retaining the position of the Automobile Club as the premier organisation of the movement.

John S. Montagu.
Arthur Stanley.
Hugh Weguelin.
F. P. Armstrong.
C. Johnson.
Theodore Chambers.
H. Deasy.
C. Jarrott.
F. H. Butler.
Stanley Spooner.
G. C. Ashton Jonson.
C. E. Shaw.
Henry Sturmey.
Fredk. R. Simms.
Mark Mayhew.
Robert E. Phillips.
William J. Bull.
Wroth P. C. Lethbridge.
Henry Norman.
Stuart Bouverie.
Claude Watney.
E. Cozens-Hardy.
M. O'Gorman.
George Montagu.
E. Keynes-Purchase.

It will be noted in the Committee list printed above that after each candidate's name his services to the club or his profession, and the name of any firm or company in which he is interested, are also frankly stated for the information of the member voting.

THE 1904 DAIMLER PETROL CARS.

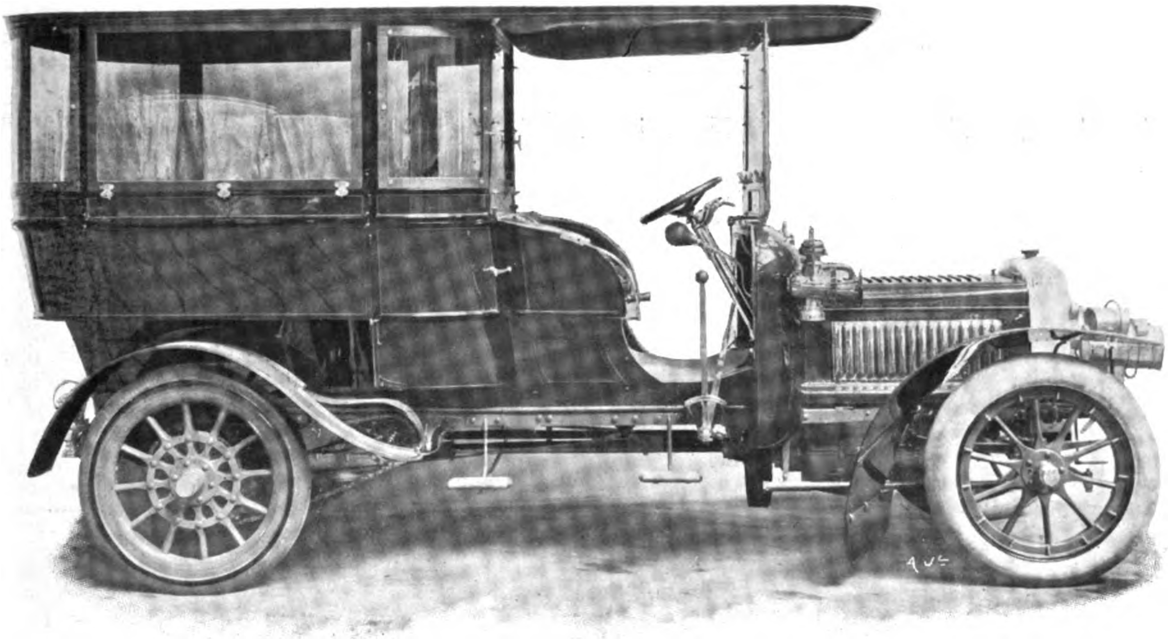


FIG. 1.—A 28-36-h.p. Daimler.

WE have already referred briefly to the two new types of car which are being built by the Daimler Company in their works at Coventry this year, and we gave an illustration of a vehicle of each power, in conjunction with our first report of the recent Exhibition at the Palace. Each of these models is made in two different sizes, differing in length of frame and wheel base—and both of them are of precisely similar design throughout, so that although there are in reality four new types of car introduced, yet, except in respect of dimensions, the same description applies to all. The vehicles have been very considerably improved in many important respects, as compared with the Company's last year's models, and have been thoroughly brought up-to-date. The most noticeable changes relate to the construction of the main frame and the suppression of the underframe, to the engine, which is entirely different, and to the greater comfort and convenience of the cars by increasing their length, and rendering them much more silent. Most of these makers' special features have, however, been retained, noticeably in the construction and suspension of the change-speed-gear, in the employment of two compensated brakes on the differential countershaft, and in fitting the bodies so that they can be hinged up to give thorough access to the mechanism.

Both the new engines are of the 4-cylinder types, the larger developing 28-h.p. at 700 revs. per min., and 36-h.p. at 1,000 revs. per min., whilst the smaller gives

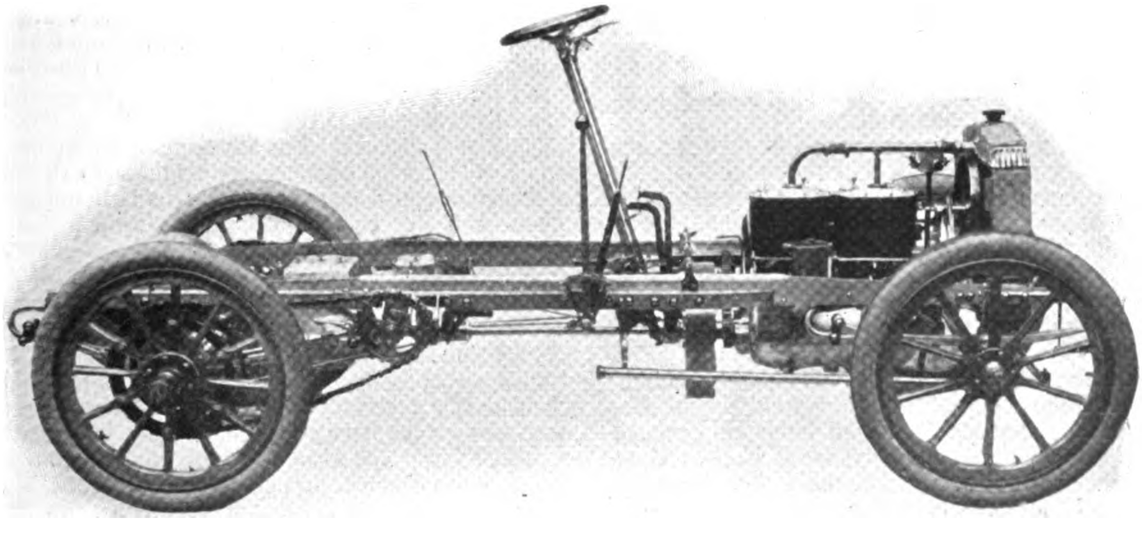


FIG. 2.—View of an 18-22-h.p. Daimler Chassis from the Right Side.

18-h.p. at 800, and 22-h.p. at 1,000 revs. per min. One of the 28-36-h.p. standard chassis has a wheel base of 9 ft. 6 in. and a track of 4 ft. 3 in.; the larger model has an 11 ft. wheel base and a track of 4 ft. 7½ in. The respective weights of these two chassis are 18½ and 22 cwt., and in both cases 36-in. wheels are fitted. The 18-22-h.p., shorter car, has a wheel base of 8 ft., a track of 4 ft. 1 in., and the chassis weighs 15 cwt.; for the longer model—suitable for bodies having side entrances to the rear seats—the wheel-base is increased to 9 ft. 6 in. On both these smaller models 34-in. wheels are used.

Fig. 1 shows a 28-36-h.p. car fitted with a 7-seated body, and having an 11-ft. wheel-base. Fig. 2 is a side view of an 18-22-h.p. (8-ft. wheel-base) chassis, and Fig. 3 shows a 28-36-h.p., and 9 ft. 6. in. wheel-base, chassis from above.

The main frame is of special armoured wood construction, and is narrower in front; the engine and the gear-box are both fixed direct to it, the latter with a 3-point suspension. The frame is carried on the usual semi-elliptic side-springs, which are very long and flexible. The chassis differs chiefly from those of other makers in that the change-speed-gear is mounted behind the differential countershaft, instead of in front of it, and that both these parts are at a greater distance than usual from the main clutch, a long flexibly-jointed shaft transmitting the power between them.

The 4-cylinder engine has its cylinders cast in pairs, and all the valves lie alongside one another, so as to be mechanically operated from the same cam-shaft. The valves are mounted at an angle to the axis of the cylinders, instead of being quite vertical, as usual, so that the lower ends of the spindles are at a somewhat greater distance than usual from the cylinder castings. The engine is shown from both sides in Figs. 4 and 5, the sloping valves being visible in the former. The cam-shaft is not enclosed in the crank-chamber, and its cams do not come in contact with the valve spindles themselves. Small intermediate pivoted levers are arranged between these parts, and the levers are mounted upon a second shaft, which is attached to the cylinder casting. This shaft, and also the cam-shaft, are hollow, and provision is made by which oil can find its way from the crank-chamber through them to the various portions of the valve-operating mechanism. Inspection plugs are fitted above each of the valves in much the usual way, these screwing into the cylinder casting at a corresponding angle to the valves. The two to one spur-wheels connecting the cam-shaft with the crank-shaft are fitted at the rear end of the engine, and are not enclosed, although the whole of the machinery is finally sheathed in on the underside by a large shield.

The top of the water-jackets round the cylinders are formed by aluminium castings, which are bolted down in place, and to which the pipes leading back to the top of the radiator are attached. A high-tension system of ignition is employed, the plugs for which are fixed vertically from above, so that they project into the passages connecting the valve-chambers with the cylinders themselves. They are used in conjunction with accumulators and a single coil, and the commutator, which controls both the low-tension and the high-tension circuits, is of special construction. This commutator, A (Fig. 4), is mounted on a vertical shaft, and is driven by the bevel gearing from the cam-shaft in front, so that it is very accessible when the bonnet is raised. It has two low-tension brushes by which the necessary electrical circuit is made to the coil, and it also constitutes a high-tension distributor which alternately places the high-tension winding of the coil in communication with the four ignition plugs. The two low-tension brushes are connected together electrically, and the second one is only provided to ensure reliability in the event of the other failing to work. The Company are also prepared to fit an Eisemann high-tension magneto to the engine if required, and it can then either replace the accumulators and the commutator, or can form an auxiliary system for alternative use.

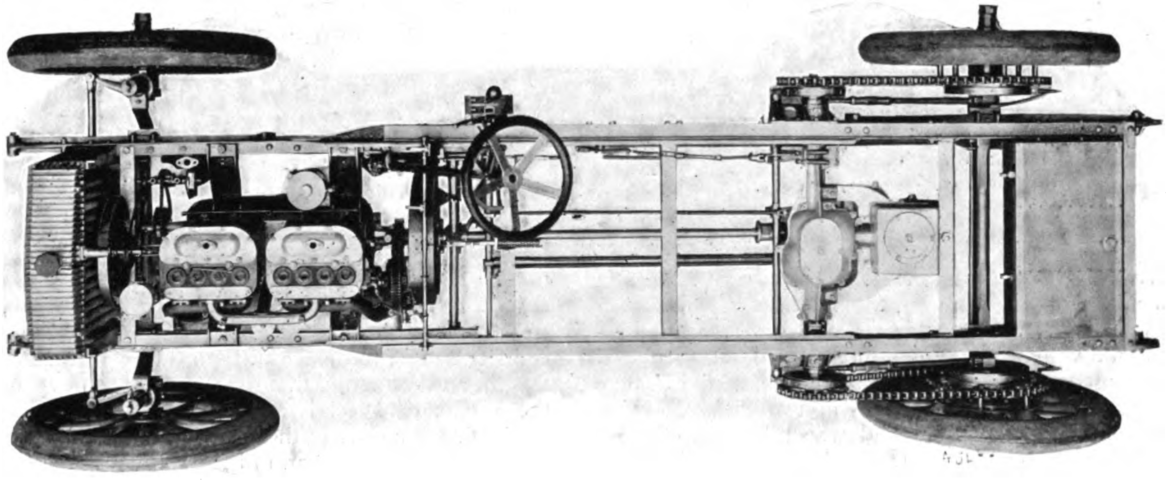


FIG. 3.—View of a 28–36-h.p. Daimler Chassis from Above.

An automatic carburettor is employed in which the admission of auxiliary diluting air is not only rendered automatic in much the same way as in the Krebs carburettor, but is simultaneously controlled as the throttle-valve is operated. The power of the engine is regulated by a centrifugal governor in much the usual way, and the normal speed of the engine is regulated by a hand-lever. The main air supply to the carburettor is taken from a chamber formed in the exhaust box, B, which lies beneath and to the left of the engine, two exhaust pipes leading to this silencer from the four cylinders.

A new type of radiator has been adopted, in which the finned tubes are mounted vertically between upper and

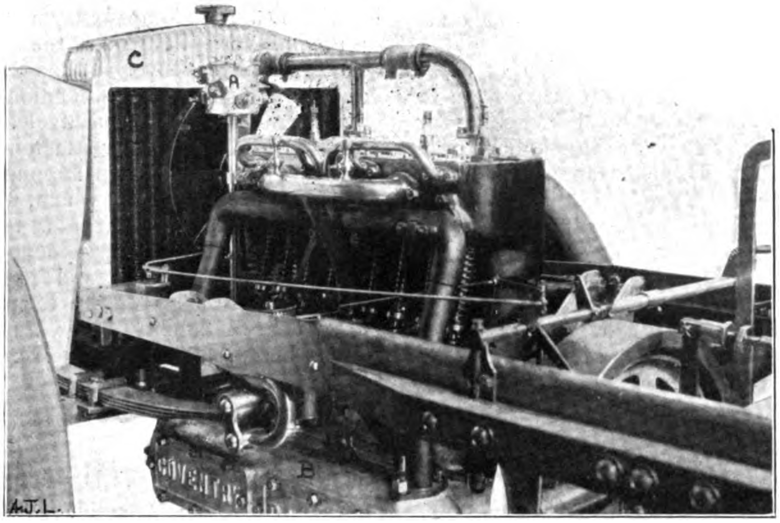


FIG. 4.—The Front Portion of a 1904 Daimler Chassis, showing the Engine from the Left Side.

lower aluminium headers, C, and the radiator forms the front of the bonnet. The air is drawn through this radiator by a belt-driven fan, the pulley for which is fitted to the pump-spindle. The pump lies to the right and in front of the engine, and it is driven by a chain. No supplementary water-tank is required, and the pipes for the circulating system are all short and direct.

The engine is lubricated through an adjustable, sight-feed fitting on the dash, and the oil itself is carried in a small pressure-reservoir which is seen in Fig. 5, alongside the engine. The necessary pressure is maintained in this reservoir by the exhaust gases.

The cylinders on the 18-h.p. engine have a bore of 95 mm. and the stroke is 130 mm. The cylinders on the larger engine have a bore of 110 mm. and the stroke is 150 mm. Both engines run at a comparatively low speed.

The Company fit their special form of curved dashboard, which not only affords a considerable amount of protection to the driver and his companion, but also enables very neat little cupboards, for the reception of small spare parts, to be furnished at either side.

Comparatively little change has been made in the main clutch, which is of the ordinary cone type, and has a very light, leather-faced internal member. It is so constructed that the strength of the spring can be easily adjusted, and that only a very light pressure is needed for depressing the pedals.

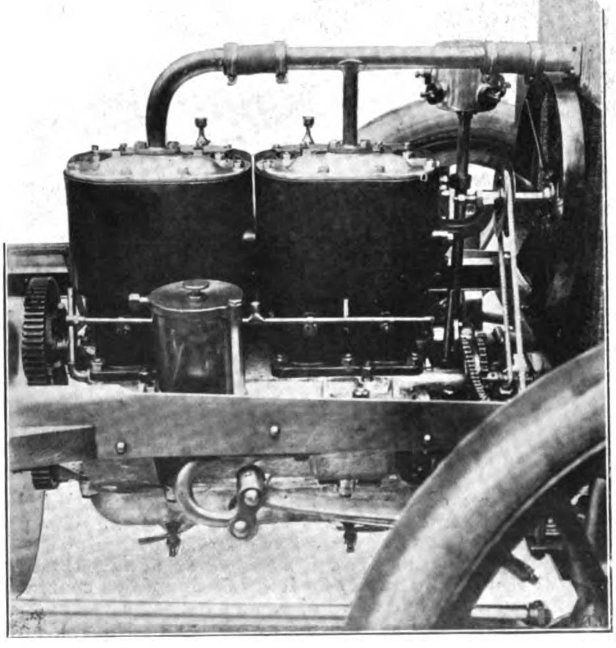


FIG. 5.—View of the Engine on a 1904 Daimler Chassis. from the Right Side.

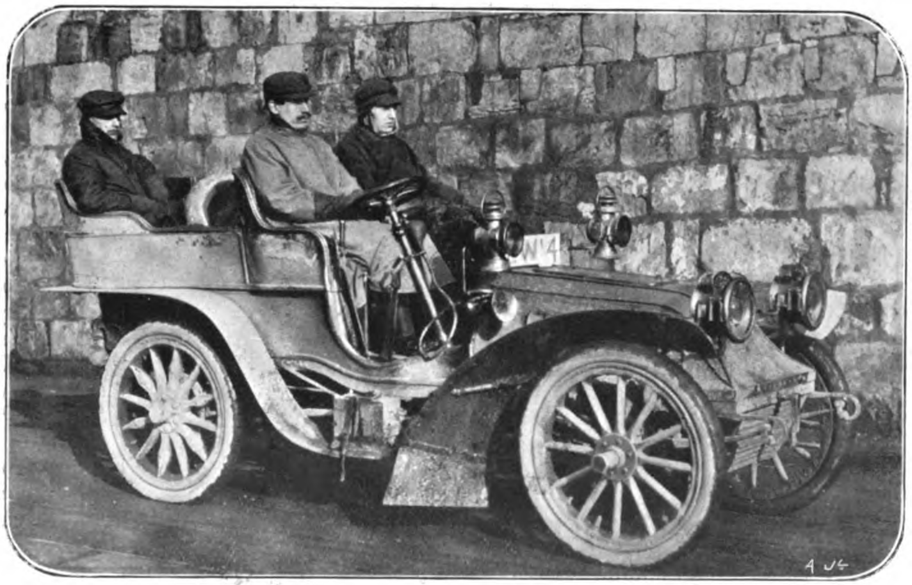
The change-speed-gear is but little altered since last year, the first-motion-shaft being immediately beneath the second-motion-shaft, and the forward end of the latter carrying the bevel that drives the differential. The gear-box itself and the differential countershaft form one unit, which is attached at three points to the main frame, and is self-aligning. The bearings are ring-lubricated, and the gear-wheels are of ample size for the power which they have to transmit. The sliding members of the gear are operated on the Mercedes principle by a lever which is moved forward or backward, in alternative slots in a quadrant, to introduce the various gears. That portion of the aluminium casing which covers over the countershaft is now made in a separate casting, and can be removed without disturbing any other portion of the mechanism. The gear-wheels are made of steel, and are hardened.

The countershaft brakes remain very much the same as before, there being two of these simultaneously operated through a simple compensating device from the foot-pedal. The brake drums are fitted close up to the sprockets at the ends of the countershaft, and the bands are tightened through a small swinging link which equalises the pull exerted by the pedal upon them; the side-brakes acting upon the hubs of the rear wheels, and operated by the hand-lever, are compensated in a very similar manner, a cross-rod passing across beneath the back-axle forming a part of the actuating mechanism. The foot-brake is connected with the clutch, but the hand-brake is entirely independent. All the brakes have a positive release, so that the bands do not rub against the drums, except when they are in use.

One of the special features in the design of these chassis, is that the length of the vehicle can be made to suit any required type of body by lengthening or shortening it without interfering with the standard propelling mechanism. When a longer frame is used, the engine and clutch assume the same position in front, and the change-speed-gear is fixed similarly with respect to the back-axle; it is, therefore, only necessary to employ a longer or a shorter propeller-shaft between the clutch and the gear. The Company have taken full advantage of this, and have prepared a great variety of designs in the way of bodies to suit the requirements of all. The bodies, in all cases, are arranged so that they can be hinged up out of the way, to give thorough access to the mechanism, and the petrol-tank, which has a large capacity, is fixed at the rear.

The Daimler Company have also introduced this year a new 16–20-h.p. engine of the same design as those we have described above. It has 90 by 130 mm. cylinders, and develops the powers mentioned at speeds of 800 and 1,000 revs. per min. respectively. This engine has been introduced especially for attachment to any of the 14-h.p. vehicles which have been supplied by them during the past year or so—200 of which, we understand, are now in use. Although their new types practically enable them to meet all requirements for touring vehicles, yet the Company are still prepared to supply their 22–26-h.p. vehicles of the type which did so well in the recent Reliability Trials, and on which, it will be remembered, atmospherically-operated inlet-valves are used.

AN important case *re* the liability of the hirer of a carriage was decided in the Court of Appeal last month. The case was Sanderson *v.* Collins, and the question was as follows:—A person who owned a carriage entrusted it to a coachbuilder for repair, and the coachbuilder lent to the owner of the carriage another carriage during such time as he (the coachbuilder) was repairing the first. From the facts it appears that the carriage in question was taken out by the coachman without his master's orders, and that the coachman, with three friends, all got intoxicated, came into contact with a tramcar, and seriously damaged the carriage in which they were driving. It has thus been held by the Court of Appeal, reversing the Divisional Court's decision, and restoring that of the County Court Judge, that the hirer under these conditions is not responsible for the damage that has been caused. This decision is of importance to owners of automobiles, as without question it would govern the hiring of motor cars as well as ordinary carriages. Assuming that the litigation is not carried further, and that this sensible decision is not reversed by the House of Lords, it means that the law now is that the hirer of a vehicle is not required to exercise more than *reasonable* care, and that he is not liable (as was hitherto generally thought) for damage caused by his servants exceeding or disobeying his orders.



The above photograph represents the first of the new 18-24-h.p. Wilson and Pilcher 6-cylinder Cars, which we recently accompanied on a trial run made by it to Newcastle-on-Tyne and back. Our photograph was taken at York on the return journey, and indicates by the state of the car the heavy nature of the roads at the time. The trial was a thorough success (apart from tyre troubles), the car running splendidly throughout. The distance travelled was over 700 miles, so that we had ample opportunity for forming an opinion concerning the merits of a 6-cylinder engine. The almost entire absence of vibration and noise, and the large working range of engine speed, which enables most of the running to be accomplished on the top speed, were particularly noticeable and pleasing. The power of the engine was sufficient to enable very constant speed to be maintained almost the whole way, whilst abnormal hills, such as those around Durham, were negotiated at a fair pace, and with ease. The engine, too, proved economical; during the 200 mile run from London to York the petrol consumed was only 10 gallons.

THE RYKNIELD PETROL CARS.

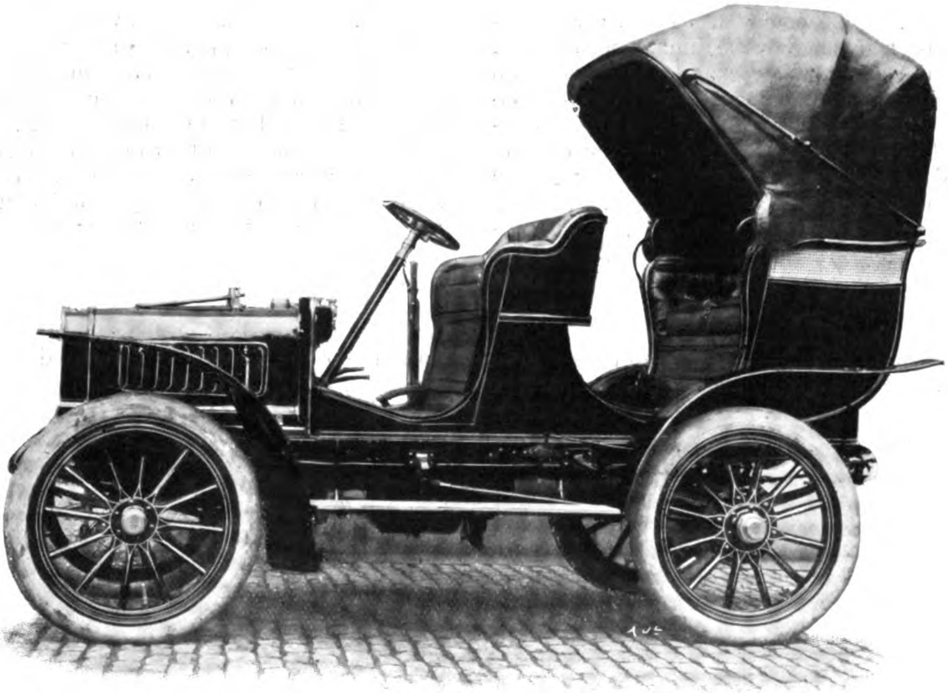


Fig. 1.—A Twin-Cylinder 10-h.p. Ryknield Petrol Car.

Amongst English-built cars, those constructed by the Ryknield Engine Company, at Burton-on-Trent, deserve attention, not only because they are of good design and strong construction, but also in consequence of the adoption by these makers of several new features which they themselves have invented and developed. They have for some considerable time been engaged in this work, although, previous to the recent exhibition, at the Crystal Palace, they have not thought fit to bring their vehicles before the notice of the public, but have been quietly carrying out the necessary long-duration trials and experiments which are so necessary to ensure the subsequent satisfaction of their customers. The first type of car to be introduced by them has been a 10-h.p. vehicle with a twin-cylinder engine, and this is now being followed by a 20-h.p. model, with which a four-cylinder engine is used. The smaller car is of the live-axle type, and the larger one has side chains for transmitting the power to the rear wheels. We understand, too, that considerable progress has already been made with an even larger model, the engine for which is nominally of 36-h.p.

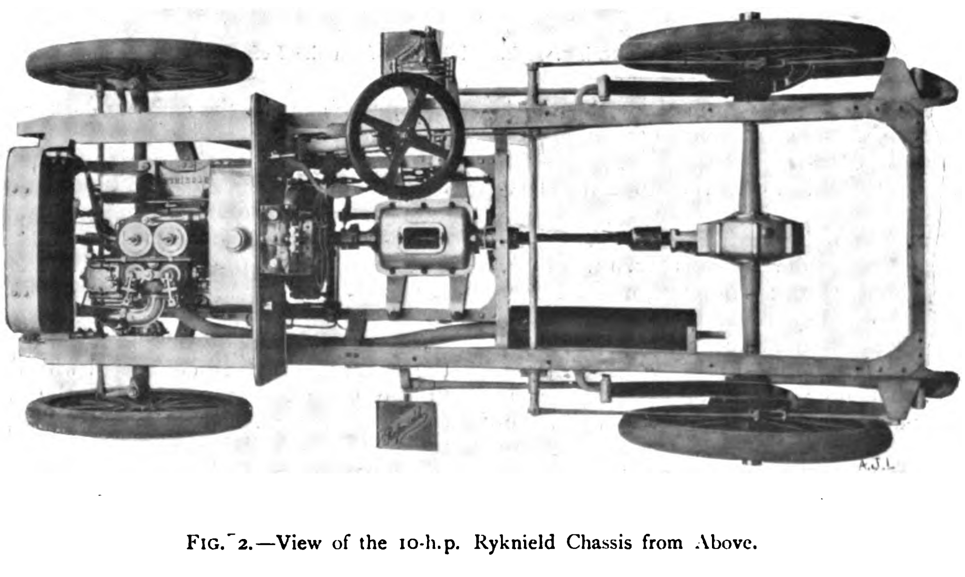


Fig. 2.—View of the 10-h.p. Ryknield Chassis from Above.

The special features of the Ryknield vehicle relate to the engine design, to the main clutch, to the steering gear, and to the arrangement of the small hand-levers near the steering-wheel. The engine has its mechanically-operated inlet-valves actuated by the same cam-shaft that controls both the exhaust-valves and the low-tension igniters, and the mechanism is so arranged that the inlet-valves can be very easily and quickly removed for inspection, if required. The main clutch is entirely distinct from the flywheel, and is flexibly connected both with the crank-shaft and with the change-speed-gear. Its internal member has cone faces on either side of it, and is surrounded on both sides by external clutch members which are drawn together about it, by no less than six pairs of adjustable springs. The steering-gear is rendered irreversible by a triple worm acting upon a travelling nut, and the nut is made in two pieces so that all back-lash in the threads can be taken up by forcing the two parts of the nut away from one another. The hand-levers regulating the speed of the engine, from the neighbourhood of the steering-wheel, are operated from above the wheel, although their motion is communicated to the engine by rods passing down outside—instead of inside—the steering-pillar; the mechanical construction of the steering gear is thus simplified.

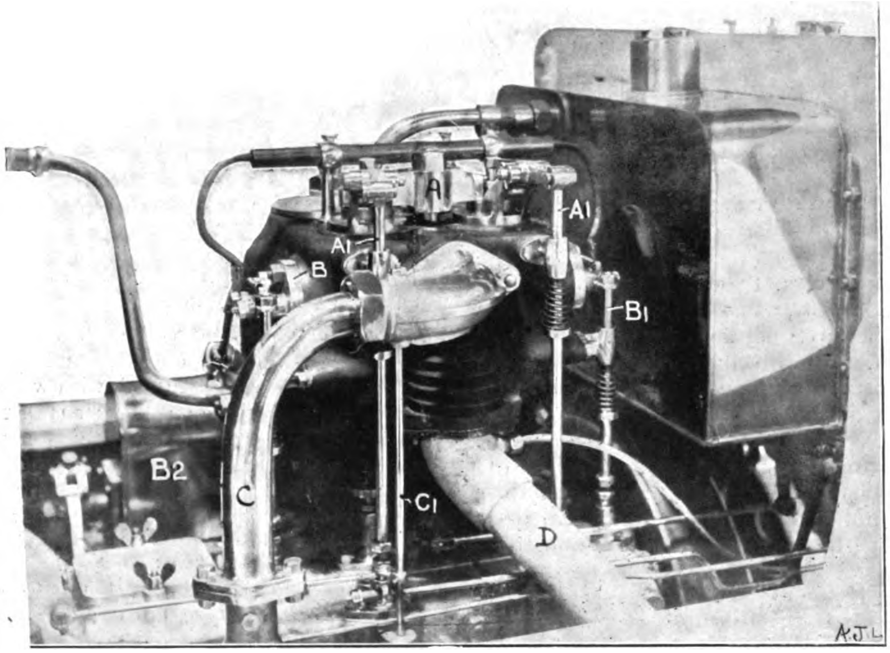


FIG. 3.—The 10-h.p. Ryknield Engine from the Left Side.

One of the complete 10-h.p. cars is shown in Fig. 1, and a view of the chassis from above is given in Fig. 2. The car weighs about 15 cwt. complete, and all four wheels are shod with 810 by 90 mm. tyres.

A glance at Fig. 2 shows that the general arrangement of the parts is the same as on most other vehicles of the live-axle-type, so that no very lengthy description is necessary. The main-frame is constructed of hydraulically pressed steel, and the engine and the gear-box are fixed to a channel underframe. Semi-elliptic side springs are employed, and very long radius-rods connect each end of the live-axle with the main frame.

Fig. 3 shows the engine in place on the car from the left side. Its two cylinders are formed by a single casting, and the inlet-valves are held down on the top of the valve-chamber, above the exhaust valves, by a single yoke, A, and one nut. The valve-seat castings are formed with brackets to support the small fulcrumed levers, by which the valves are operated from vertical push-rods, A^1, projecting up from the crank-chamber. The pivoted levers are hinged at the top of the rods, A^1, so that, when the yoke, A, has been taken off, either of the valves can be lifted out without further trouble. The push-rods, A^1, are operated from the same cam-shaft that lift the exhaust-valves, in the ordinary way, the connecting mechanism being enclosed in the crank-chamber.

Low-tension igniters, B, are fitted horizontally into the walls of the two valve-chambers, and these are worked by vertical rods, B^1, from the cam-shaft. The necessary current for the igniters is generated by a Simms-Bosch magneto, B^2, of the oscillating type, which is driven by a crank-pin on the front end of the crank-shaft. The time of ignition can be varied by a small hand-lever from the dash, which causes the cams to engage either earlier or later with the rods, B^1.

The crank-shaft on this engine is "built up," instead of being a solid forging, though it is not like most "built-up" crank-shafts, because there are no flywheels inside the crank-chamber. All the moving parts are fed with oil from a sight-feed, pressure lubricator on the dash, and the oil is distributed inside the crank-chamber on the splash principle.

The centrifugal governor is fitted on the front end of the cam-shaft, and is connected with the throttle-valve in the induction pipe, C, by the vertical rod, C^1 (visible in Fig. 3). The action of this governor is controlled in much the usual way by a hand-lever on the steering-pillar, which regulates the normal speed, and by an accelerator-pedal which can entirely neutralise its action. On the vehicles hitherto made, one of the well-known Longuemare carburettors has been employed, but we understand that the company will shortly substitute an automatic one of their own make. The second lever on the steering-pillar now controls the richness of the mixture. The vehicle has an 8-gallon petrol tank fitted beneath the front seat, and the feed to the carburettor is by gravity.

The cooling water is carried in a radiator forming the front of the bonnet, and in an auxiliary tank fixed to the front of the dash-board. It is circulated through the cylinder-jackets by a pump of the gear-wheel type, which is fixed to the crank-chamber and is driven by the spindle of an intermediate gear-wheel, through which the cam-shaft is caused to rotate by the crank-shaft. The radiator employed has finned tubes, which are neatly arranged to form a compact cooler.

The engine is not only controlled, as we have already said, by varying the time of ignition from the dash-board, by interfering with the action of the governor on the throttle-valve (from the steering-pillar and from the accelerator-pedal), and by regulating the carburettor, but it is automatically slowed down when the clutch-pedal is depressed; for this purpose the clutch-pedal is connected with the throttle-valve.

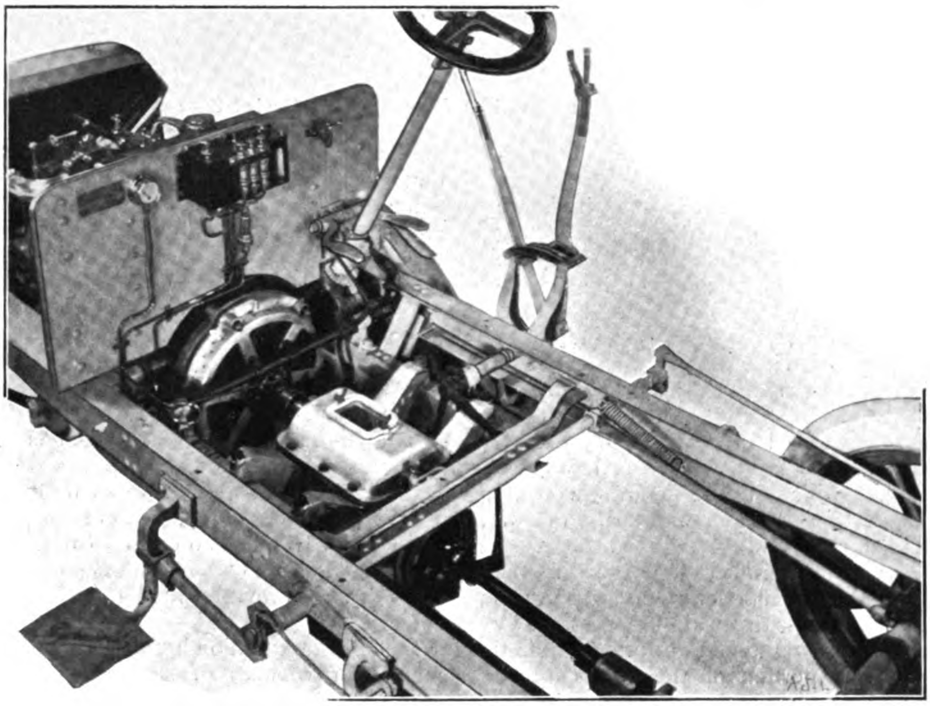


FIG. 4.—Central Portion of the 10-h.p. Ryknield Chassis, showing the Main Clutch, the Dash, and the Regulating Pedals and Levers.

The main clutch is seen in position, in the chassis, in Fig. 4, and is shown, both sectionally and in elevation, in Fig. 5. It is mounted about an intermediate shaft, which is flexibly connected both with the rear end of the crank shaft, C, and with the front end of the change-speed gear-shaft, D, so that the clutch is self-aligning, and practically "floats." Mounted freely about this intermediate shaft are a pair of external clutch members, A, which are normally held together by the springs, A^2, and the guide bolts, A^1. These two members also interlock with one another at three points, the one member having projecting blocks, A^3, which ride in corresponding slots in the periphery of the other, for this purpose. These blocks, A^3, allow the two members, A, to move towards or away from one another, but ensure their revolving together about the shaft. When drawn together they come into contact with the cone faces of the internal clutch member, B, which is keyed to the central shaft, and thus the power is transmitted from the internal member, B, through both the external members, A, to the crank shaft, D. Both the members, A, are directly acted upon by the clutch pedal, E, which causes the two rocking shafts, E^1 and E^2, to turn about their axles. The rocking shafts are provided with fork members, E^3, which engage with grooves in the sleeves, to which the clutch members, A, are bolted. It will be noticed that by this arrangement no end thrust is imposed on any of the revolving shafts, either when the clutch pedal is depressed or when the clutch is in engagement. It will also be seen that a very large friction surface is obtained, and that both external clutch members are held up against the internal cone with the same degree of pressure. The springs, A^2, can easily be adjusted, and the entire clutch can be removed in a few minutes by disengaging the ingenious flexible couplings employed on either side of it.

The change-speed-gear itself is of the usual sliding-spur-wheel type, and does not call for any special notice. It provides three forward speeds and a "reverse," and its second-motion-shaft is arranged immediately beneath the first-motion-shaft. A single side-lever is used for operating it, the lever moving over a simple quadrant. The power is transmitted from the change speed-gear to the live-axle by a universally-jointed propeller-shaft. The whole of the transmission gear is provided with plain bearings, ball-bearings being only used to take the thrust of the bevel-wheels. The road wheels are mounted upon the back-axle, so that they revolve upon stationary bearings, and that the weight of the vehicle does not come upon the revolving members of the axle; the two live-shafts are therefore subjected to no

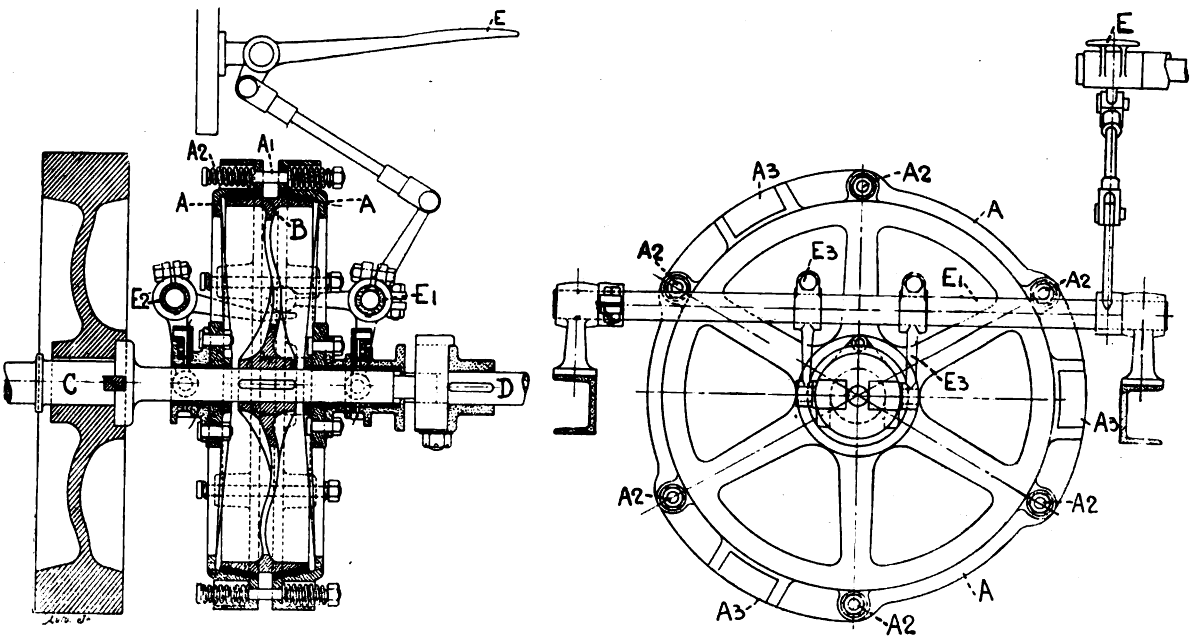


FIG. 5.—Cross-Section and End Elevation of the Ryknield Duplex Cone Clutch.

bending strain, and are merely connected with the road-wheels by jaw-couplings.

The ordinary brakes are provided, but these are operated in a somewhat unusual manner, those acting upon the hubs of the rear wheels being actuated by the foot-pedal, and the brake on the rear end of the second-motion-shaft being applied by the hand-lever. The foot-brake is, as we have already said, interconnected with the throttle-valve on the engine, but it does not disengage the main clutch when applied; the hand-brake, however, withdraws the main clutch when it is applied.

The steering-gear is enclosed in a neat oil-tight case, made in two parts. The casing receives the lower end of the steering pillar, which, inside it, has a triple screw thread cut upon it. A large nut, made in two pieces, rides upon the thread, and engages with the usual fulcrumed arm from which the rod passes forward to one of the steering-heads on the front axle. The two portions of the nut can be forced apart with any desired pressure by a tapered bolt, which can be tightened up to the required extent, and thus the one portion of the nut is forced upward, while the other portion is forced downward, pressing it against the other sides of the threads. Back-lash between the worm and the nut can thus be taken up; the steering-pillar itself is also prevented from having any play by an adjustment screw fitted into the bottom of the casing.

The small hand-levers mounted on the steering-pillar are fixed to concentric sleeves riding freely upon the outside of the pillar itself, close up to the wheel on its underside, and the levers project up between the spokes of the wheel, so that they can be moved from above. The sleeves to which they are attached have cam faces formed in them, and these cams force other similarly fitted sleeves downwards as they are turned. The sleeves against which they work are normally held up by spiral springs, and are fixed to rods passing down outside the steering-pillar, in just the same way that the earlier type of hand-lever is fitted to a steering-pillar below its wheel. The duties of these two levers have already been explained.

The 20-h.p. Ryknield car, which is of the side-chain type, as we have already said, has the same novel features as the 10-h.p. car which we have just described. Its 4-cylinder engine is, however, equipped with high-tension ignition, in addition to a low-tension magneto system. The standard car has an 8-ft. wheel base, and the gear-box provides four forward speeds and a reverse.

Some little attention has also been given to the manufacture of vehicles of similar construction for commercial work, and the company are now supplying light 10-h.p. delivery vans, besides 20-h.p. station 'buses. The chassis of the delivery van is the same as that for the 10-h.p. touring car, except in comparatively small details, as, for instance: that a channel steel main-frame is used, only two forward speeds and a reverse are available, solid rubber tyres are fitted, and that the small hand-levers controlling the engine are fixed on the steering-column itself.

A SERIOUS attempt is being made to join up a number of outlying districts in Denmark by means of automobiles. The company taking up the scheme will start with about seventy vehicles, and is to have a ten years' concession for working the roads in districts at present unserved by railways. For some time the Government have had in contemplation the building of a series of third-class railways in the country, and the new automobile service will, it is proposed, be in place of these lines.

SEVERAL of the principal automobile builders on the other side of the Atlantic have adopted the practice of bringing out, regularly, magazines of their own. This is notably the case with the White Company, who have sent us the fourth number of the "White Bulletin," which gives a beautifully illustrated description of the 1904 White Cars and explains the principal features and merits of the system, giving also some of the excellent results obtained by these vehicles in the 1903 Endurance Runs.

THE 20-h.p. THORNYCROFT PETROL CAR (1904 MODEL).

THE 20-h.p. Thornycroft petrol car has been modified in a few important respects since last year, but has undergone no radical alteration in design since it was described by us about a year ago (February 14th, 1903). The chief alterations now are, that the engine is fixed in a slightly sloping position instead of being absolutely vertical, that an improved form of commutator, mounted upon a vertical shaft inside the bonnet, is used in conjunction with it, that the carburettor is provided with a jacket through which the whole of the cooling water is circulated, that very neat hand-levers for regulating the engine are fitted above the steering-wheel, that an entirely new form of clutch of the Weston or Hele-Shaw type is used, that a hinged transverse spring is mounted beneath the back of the main frame to give a flexible support to the rear ends of the side-springs, and that three radius rods are fitted between the back-axle and the frame.

One of the latest complete cars of this type is seen in Fig. 1; we published views of the same model, fitted with two other forms of body, in our issue of February 13th last. The chassis itself is shown from the right hand side in Fig. 2, and from above in Fig. 3, whilst Fig. 4 is a view of the central portion, which shows the clutch, the dash, and the regulating levers and pedals.

The pressed steel main-frame is formed with an underframe for supporting the 4-cylinder engine and the gear-box, both of which assume the usual positions assigned to them in the majority of up-to-date cars. The frame is suspended on semi-elliptic side springs, and the car is rendered even more comfortable than usual by the provision of an inverted semi-elliptic transverse spring, the centre of which is hinged to the back member of the frame, and the ends of which carry the rear ends of the side springs. This transverse spring gives considerably increased flexibility, and, being hinged, it allows the side springs to have free play. The live-rear-axle is of very substantial construction, and was adopted by the Thornycroft Company, in preference to side chains, after they had given the question a considerable amount of attention. The size of the various parts, and the strength of the materials employed, have been carefully considered, and the Company have convinced themselves that a live-axle such as theirs is in every way as strong and durable as are the parts used when side chains are employed instead. The three radius rods which connect the axle with the frame are visible in Fig. 3, where it will be noticed that those which take the "drive" pass from each end of it to the underframe, whilst the third, which relieves the springs of all twisting strains, is connected between the central casing and the intermediate cross-member of the main frame.

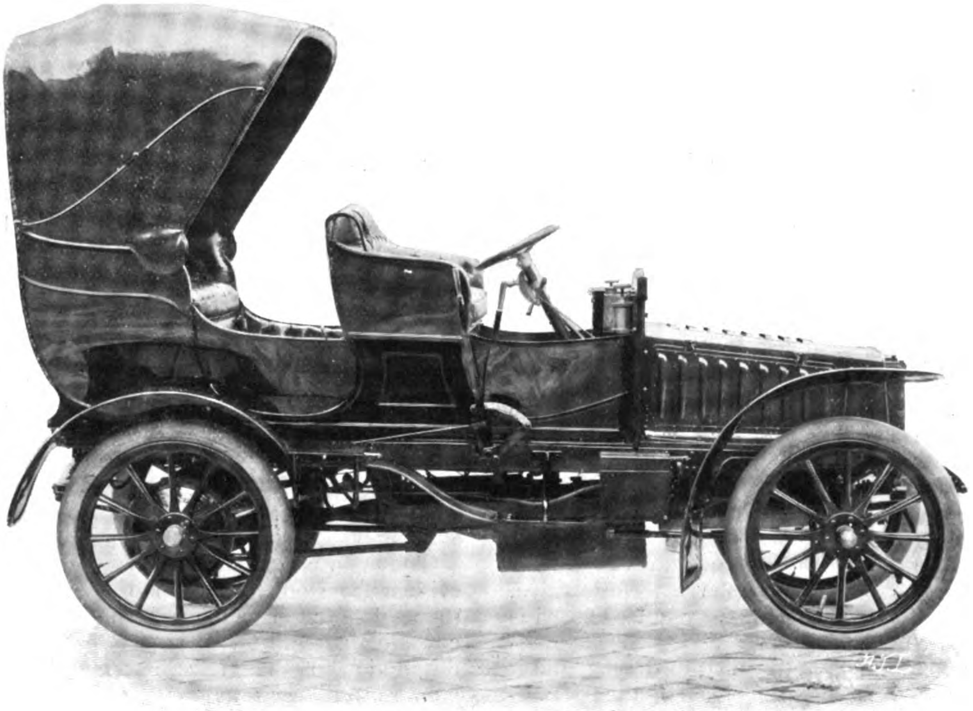


FIG. 1.—One of the latest 20-h.p. Thornycroft Petrol Cars.

The engine, which has a normal speed of 900 revs. per min., has its cylinders cast in pairs, and is fitted with atmospheric inlet-valves, placed above the exhaust-valve. Its crank-shaft slopes slightly downwards at the rear, so that a more direct and straight drive is obtained, through the gear-box and the propeller-shaft, to the live-rear-axle. The engine itself is in general respects the same as last year, except that the commutator is mounted upon a vertical shaft in front, and is driven by bevel-gearing from the cam-shaft. This commutator is chiefly interesting because it is provided with a second-contact

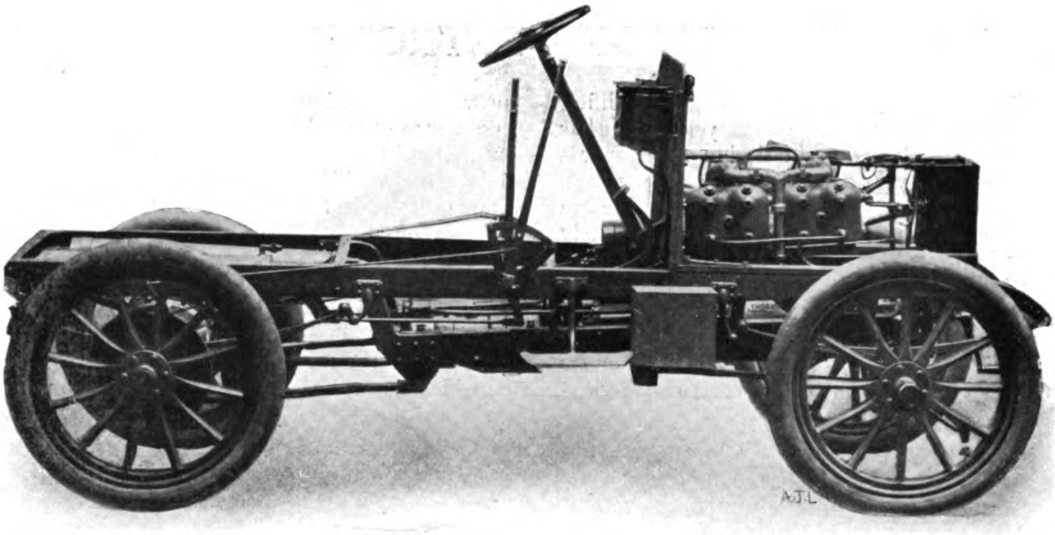


FIG. 2.—Side View of the 20-h.p. Thornycroft Chassis.

brush, between which and the main brush a resistance is introduced; the object of this resistance is to prevent sparking, the arrangement being somewhat similar to that adopted on the Crouan cars some little time ago. The exhaust-pipe fitting, connecting each pair of cylinders with the exhaust-pipe itself, is cast with radiating fins, as seen in Figs. 3 and 4, and it will be noticed (in Fig. 3) that the exhaust-box is fixed at the back. The water is circulated through the cylinder and carburettor jackets, from the honeycomb radiator, by a gear-driven pump fixed to the crank-chamber and driven by spur-wheels from the engine. A belt-driven fan is mounted behind the radiator to induce the necessary draught through it. The engine is controlled by an automatic governor acting upon a throttle-valve, and its action is regulated, so that the required speed is maintained, by an accelerator-lever above the steering-wheel. The carburettor is of the float-feed type, and it is fitted with an automatic, spring-loaded, auxiliary air-valve. The time of ignition can also be varied by a similar lever, above the wheel. The neat arrangement of these small hand-levers can be gathered from Figs. 3 and 4, where it will be noticed that they project through a slot in the sides of an aluminium casing, attached to the steering-wheel. The spring of the levers tends to raise them, and the levers engage in toothed quadrants formed on the under-face of the cover of the case. It is more natural to depress a lever of this kind than to raise it, and this is what has to be done before moving either lever from one position to another. The levers themselves are connected by wires, passing through the steering-pillar, with the parts which they control.

The main clutch takes up but very little room, as is evident from an inspection of Fig. 4. It has metal-to-metal friction surfaces, the areas of which are considerably greater than on ordinary clutches. A description of the Hele-Shaw clutch appeared in our columns on Aug. 1st and 8th last, and we also published

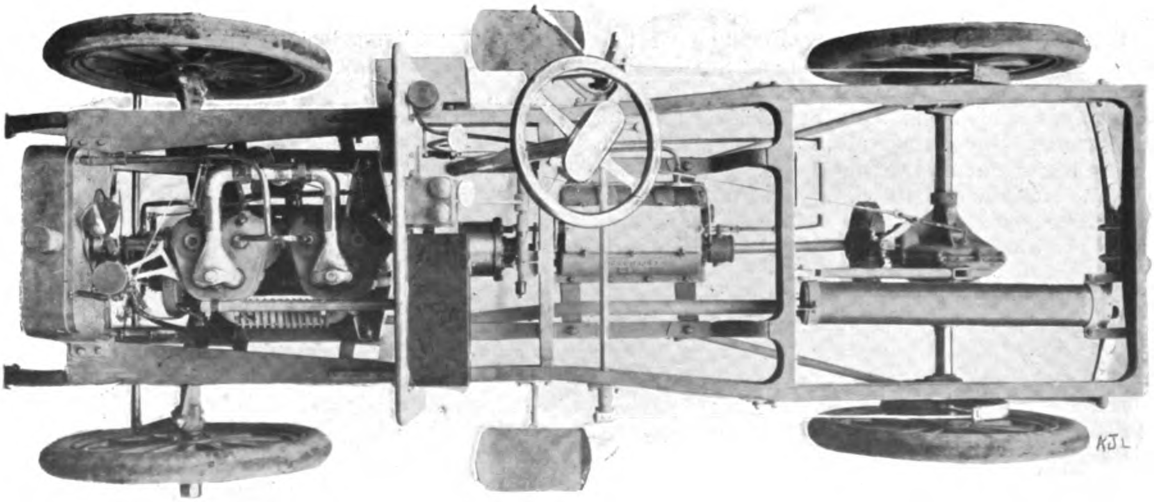


FIG. 3.—View of the 20-h.p. Thornycroft Chassis from Above.

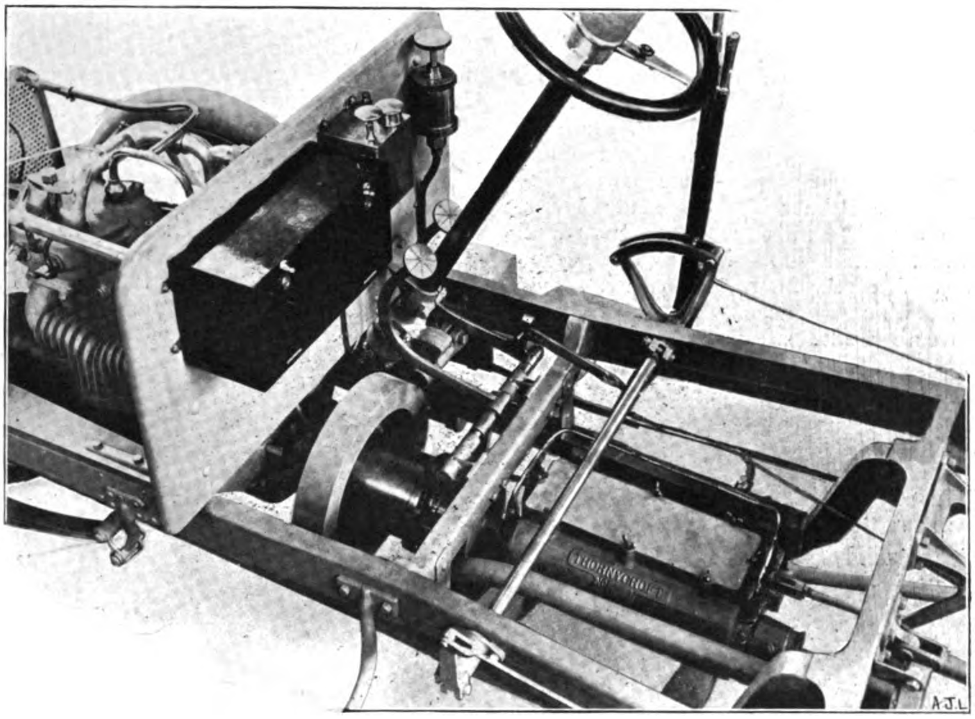


Fig. 4.—Central Portion of the 20-h.p. Thornycroft Chassis, showing the Main Clutch, the Dashboard, and the Regulating Levers and Pedals.

illustrations of the Thornycroft reversing gear, in which these clutches are used for launch work, in our issue of June 13th last. Briefly stated, this form of clutch has an external drum forming the one member, and a central shaft inside it forming the other member. To the shaft are fixed, on feather keys, a large number of discs, and inside the drum—fixed to it in the same manner—are a corresponding number of similar discs, arranged alternately with, and between, those carried on the shaft. Means are provided for forcing all these discs up close together, into contact with one another, so that the friction between their surfaces locks the shaft to the drum. Such clutches as these are usually allowed to run in oil, and a special feature of the Hele-Shaw design is that the plates are corrugated, so as not to fit quite snugly up against one another, but to leave sufficient space for the circulation of oil between them. The clutch is operated by a foot-pedal in the usual way, and this is interconnected both with the foot-brake and the hand-brake.

A direct-through-drive on top speed is provided by the change-speed-gear, and the lay shaft in the gear-box remains stationary when the car is travelling on that speed. The sliding spur-wheels, giving three forward speeds and a reverse, are mounted on one sleeve in the box, and the various gears are introduced by moving the usual hand-lever backwards or forwards in a simple notched quadrant. A grease lubricator on the dash permits the driver to keep the bearings of the change-speed-gear well lubricated. The remainder of the transmission gear remains unchanged since last year, the power being conveyed through the universally-jointed propeller-shaft, and bevel gearing, to the back axle. The whole of the gear is fitted with plain bearings, balls only being used for thrust bearings.

The usual brakes are fitted; that operated by foot-pedal is fixed at the rear end of the propeller shaft, close up to the axle.

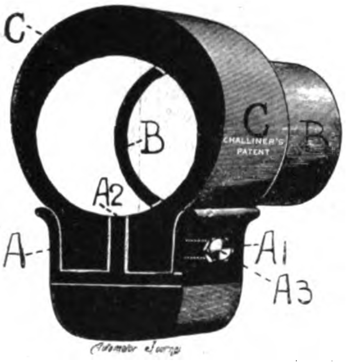
These vehicles are of very simple construction throughout, and have been very carefully designed, even in minor respects. The various parts are therefore ready of access, and all the small connections, such as pipes, wires, and rods forming parts of the controlling devices, do not interfere with the removal of inspection covers, or the making of any needed adjustments.

The Thornycroft vehicles are fitted with a variety of well made and nicely finished bodies, adapted to various requirements, and the 20-h.p. vehicle is in every way suitable for long-distance touring.

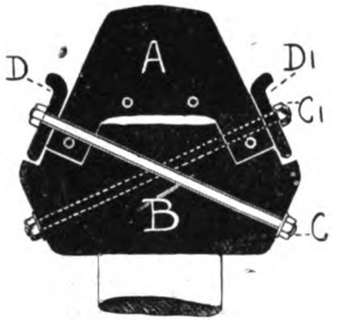
Possibly Stevenson's cow has a descendant at Patcham, near Brighton, for Mr. Oliver, a London driver with as many Christian names as a French Marquis (which we do not accordingly give), is stated to have knocked down a cow recently in that hamlet, and driven over the top of it without injury apparently resulting either to the prostrated cow or the over-riding car. Stevenson always maintained, when asked the question, that in the case of a collision between a railway train and a cow, it would be bad for the cow, though trains have been derailed in this way occasionally. On the last occasion of a collision between a motor vehicle and a cow, it was the automobile that came off second best. Now the honours seem to be divided, though the driver was fined £5 by the Hove magistrates for driving to the public danger, the cow being looked upon, apparently, as a member of the Sussex public.

TYRE EXHIBITS AT THE CRYSTAL PALACE.

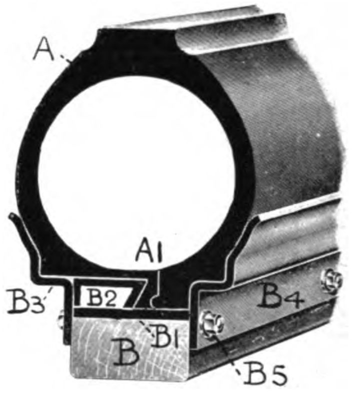
THE tyre exhibits at the Crystal Palace were in every way representative, all the well-known manufacturers being represented; great trouble had also been taken by them to make their stands attractive, for they are of necessity somewhat handicapped in this respect as compared with motor car manufacturers. More particularly may be mentioned the Palmer Tyre Company, whose artistic decoration of their stands made the Industrial Court one of the brightest spots in the Exhibition. Their exhibit was of a very interesting nature. The Palmer cord tyre, which we dealt with very fully in our issue of November 28th last year, was shown in various stages of its manufacture, two operatives being employed in the actual process of its construction. An apparatus had been erected on one of the stands, by which the resiliency of the tyre was demonstrated. The tyre attached in place on an ordinary artillery wheel was given a drop of ten feet, the measured rebound showing a resiliency of from 75 per cent. to 80 per cent. in every case. Single strips of the cord fabric were shown supporting weights of one ton, to draw attention to their tensile strength and to the security of the beaded edge. It will be remembered that in one form this tyre is adapted for use with flanges for fastening it to the felloe.



The Shrewsbury and Challiner Pneumatic Tyre.—A, fixed flange; A^1, loose flange; A^2, rib in one piece with rim and fixed flange; A^3, bolts which screw into A; B, inner tube; C, outer cover.



The Shrewsbury and Challiner "Giant" Solid Tyre.—A, rubber tyre; B, felloe; C and C^1, security bolts; D and D^1, loose flanges.

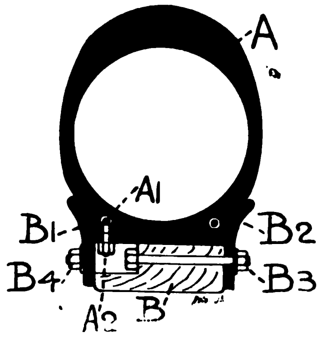


The Seddon Tyre.—A, tyre; A^1, tongue and groove joint; B, felloe; B^1, iron rim; B^2, wedge ring; B^3 and B^4, flanges; B^5, bolts for securing flanges.

Other makers who construct their tyres for flange attachment are the Martin Tyre Company, whose tubeless pneumatic we described in THE AUTOMOTOR JOURNAL, of June 28th, 1902; the Toni tyre, which we dealt with in our issue of November 29th. the same year; and the Shrewsbury and Challiner Tyre Company, who showed two new sections, illustrations of which accompany this article. One of these last mentioned is a pneumatic and the other a solid of specially heavy design, a set of which were to be seen on one of the two Great Western Railway 'buses exhibited on the Milnes-Daimler stand. The Seddon tyre is of a tubeless design, and is of a very interesting nature. As will be seen from the illustration of the Seddon tyre, the joint, A^1, in the cover is on the tongue and groove principle, and is mechanically kept tight by bolting up the flange, B, against the tyre and the ring-wedge, B^2, which keys the tyre in place on the rim. A special feature in the manufacture of this tyre is the use of red rubber. The side walls are particularly thin and flexible, only four plies of fabric being employed in their construction. Like the "Martin," the use of an inner tube is optional.

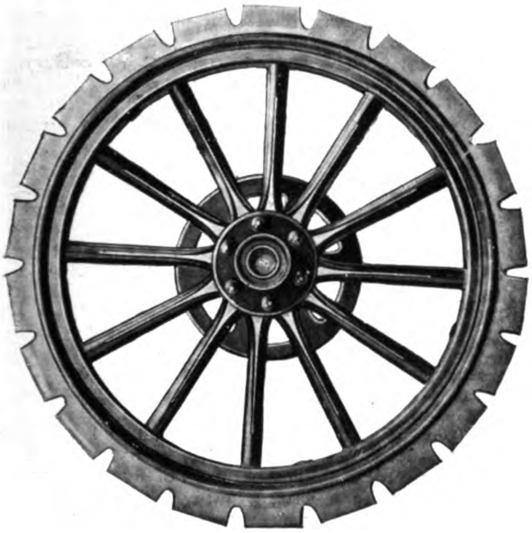
The Dunlop Tyre Company had a very complete exhibit of their well-known tyres, both with and without their non-skidding tread, in various sizes from the 2-ins. pattern for motor bicycles and the 3-ins. section for voiturettes. The Dunlop Company have also introduced two new heavy tyres of 100 mm. and 105 mm. respectively. The Clipper Pneumatic Tyre Company were making a special feature of the flat treads which they are now fitting to the Clipper Continental tyres. On the North British Rubber Company's stand was a fine show of Clincher and Clincher-Michelin tyres, some of them being shown with flat treads and small metal insertions for the prevention of side slip.

The feature of the Collier stand was their new fastening which, as will be seen from the illustration, is a great improvement on their old method, the security bolts being now out of sight; they are sunk in small pockets cut in the felloe, while the tyre is still further secured by flanges. The Hyde Rubber Works had an exhibit of Grappler tyres of which they are now the manufacturers. The Sirdar Rubber Company had an interesting exhibit of "Buffer" tyres, among which were to be seen the twin and triple tyred wheels for very heavy vehicles, a set of



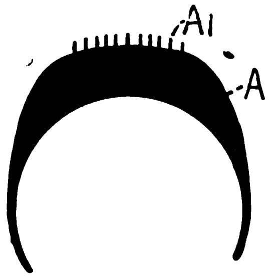
The New Collier Tyre.—A, outer cover; A^1, wires; A^2, security bolts; B, felloe; B^1 and B^2, flanges; B^3 and B^4, bolts for securing flanges.

the former having been fitted to one of the G.W.R. 'buses shown on the Milnes-Daimler stand. This Company has also introduced a new inner tube for pneumatic tyres which is intended to give immunity from nipping. The tubes are moulded so as to form, when deflated, the letter U, so that the tube can be more easily placed properly in the cover. The "Williams" solid tyre which we described in our issue of April 26th, 1902, was exhibited on finished wheels, and in sections of various sizes. Messrs. Liversidge and Sons were exhibiting the "De Nevers" grooved solid tyre, for which many advantages are claimed. Non-skid devices figured largely at the Show. The well-known Parsons non-skid was to be seen on the wheels of many of the vehicles. The "Sampson" non-skid tread, which consists of a flexible chrome leather band studded with steel studs in the tread, was shown by Capt. Masui. The "Grosse" and the "See" bands, which were also exhibited, are similar in appearance to the "Sampson" with this difference in the case of the "Grosse" tread, that the leather is arranged to be carried right over the bead of the tyre instead of stopping short of the rim. Messrs. Selbachs were showing the "Edwards" non-skid band, which consists of steel plates riveted transversely on a chrome leather band, which is then vulcanised in place on the tyre in a similar manner to the "Sampson" and others of that nature. A detachable non-skidding band was that called the "Desclée," and shown by the London Motor Garage Company. This device consists of a leather band retained in place by metal hooks carried on leather tabs placed at intervals round the tread, the hooks engaging under the bead of the rim. The tread of this non-skid band is composed of steel plates hinged together in such a way as to prevent the wheels from slipping as well as skidding.



De Nevers Grooved Solid Rubber Tyre.

The Wilkinson Tyre and Tread Company exhibited tyres embodying their wire tread, and also separate treads on the same principle. A new feature of their stand was a detachable non-skidding bracket, which is arranged for affixing to the felloes of artillery wheels. We understand, however, that this has not yet been fully developed. Another simple arrangement for attaching to wheels for the prevention of side-slip was the "Eyre" non-skid exhibited on the Star Engineering Company's stand, this consisting of wire ropes looped outward from spoke to spoke, to which they are clipped. Side-slip is said to be prevented by the tyre tripping over the wire, which in that position is enabled to check its sideway motion. Normally the wire remains at the side of the tyre. If necessary, it may be placed out of action entirely, by simply turning back the clips on the spokes; the wires then loop themselves over the hub.



The Wilkinson Wire Tread.—A, rubber tread; A^1, wire projections built into the fabric of the tread.

The Last of the 1904 Crystal Palace Show. Waiting for their freight.

MOTOR VEHICLES FOR GOODS TRANSPORT.

On Thursday evening, the 25th February, Mr. J. E. Thornycroft, A.M.I.C.E., lectured on this subject before the Glasgow University Engineering Society. The chair was occupied by Mr. Andrew S. Biggart, of Sir Wm. Arrol and Co., Limited.

Mr. Thornycroft, who restricted his remarks to steam vehicles, began by referring to the development of heavy road traction within recent years.

Starting into a new form of engineering, mistakes were naturally made, and these were brought clearly to light during the first trials instituted by the Self-propelled Traffic Association. These trials demonstrated that parts were not sufficiently strong, and as an impression existed that liquid fuel was necessary, and that condensers would be required, sore trouble arose with the clogging of the vaporising oil burners, and with grease being carried over from the condensers. In the second trials it was found that about half of the vehicles used liquid fuels, the other half using coke or coal. The condensers had also diminished in number, as it was found that if the exhaust could not be utilized as a blower a fan had to be fitted for the purpose, and this, combined with the continued trouble with priming from grease, resulted ultimately in the suppression of the condensing fittings entirely.

When the third trials were held it was found that nothing but hard fuel was used, combined with compound engines, and, generally, two gears, and this it might be said was the form in which steam was used in most of the heavy traffic road motors to-day.

Mr. Thornycroft then proceeded to describe the various kinds of boilers employed, locomotive type, vertical, and water-tube, illustrating his remarks by means of lime-light views of drawings, and commenting on the several sorts as they were shown on the screen. The De Dion-Bouton boiler, the first of its kind was at present used in this country by the Straker Company; the Lifu boiler was a splendid steam getter, but difficult to clean; Clarkson and Capel used a high-pressure boiler in which the pressure rose to 200 lbs. per square inch against the usual 120 to 140 lbs. This was the only survivor of the early boilers, and was fitted to many of the London fire-engines at the present time. Coulthard, of Preston, used a boiler from which the shell could be entirely removed for cleaning purposes. A locomotive type boiler gave rise to the remark that a brick bridge could not be used in it because the road vibration would quickly shake the bridge to pieces, and speaking of the difficulty of cleaning this type from scale gathered from the use of hard water, it was remarked that in passing through different districts in which water was used, differing in quantity or character of the hardening solids in solution, the different qualities had the effect of so softening the scale that it could be flushed out. A curious looking boiler having two combustion spaces used by the Yorkshire Wagon Company, of Leeds, was next commented on, and the lecturer passed on to the water-tube boiler used by his own firm, the advantages and disadvantages of that system being referred to.

Coming to the engine itself Mr. Thornycroft stated that although all were compounded, as few parts as possible were used, to avoid trouble on the road. By means of a valve a number of the compounds could have both cylinders high pressure, thus securing more power on an emergency or for hill-climbing. The valve used was a simple affair not likely to get out of order. Piston valves had been experimented with a good deal, but they had not been successful on account of the difficulty in getting rings to fit and wear. The ordinary slide valve was generally employed, and was found to work very satisfactorily. Mr. Thornycroft then described his own firm's engine the gear used, special attention being drawn to the use of a single eccentric, combined with the usual flat slide valve. In general, he said steam motors of the kind described in the lecture worked at from 500 to 600 revolutions per minute, the dimensions of the cylinders being from 4 in. to 4½ in. bore in the high-pressure, and 7 in. bore in the low-pressure cylinders, and 6 in. stroke. At this point, before going on to consider the question of transmission, he gave a quantity of statistics regarding the water and fuel consumption during the various trials and their results from a gross-ton-mile point of view.

Transmission, he went on to say, varied more than any other part of the machine, and various devices had been adopted for the purpose of overcoming the difficulty of the varying relative positions of the driving mechanism and the driving axle. A common practice was to use side chains of different kinds with a radius rod to adjust the differences of level. In the case of the Straker lurry a single chain was used, but this involved the use of a much heavier axle, a trouble compensated for by the much cleaner condition of the chain due to its being away from the wheels.

Mr. Thornycroft then exhibited a large number of photographs of motor lorries in use in various parts of the world, from Newark, N.J., to Singapore. In exhibiting a motor lurry and trailer bought by the War Office, he stated that it was in contemplation to form a special staff of officers to operate an enormous quantity of motor power for war haulage and rapid transport work from traction engines to motor cycles. In showing a motor 'bus used by the London Carriage Company for experimental purposes, he remarked that one of the greatest difficulties experienced by the company was in getting suitable men to drive The combination required for a good driver included skill in operation, carefulness, and enough nerve to drive through crowded streets at the best pace possible. Lurries were shown carrying sugar cane in Mauritius, gold-bearing quartz in South Africa, and mention was made of the fact that lorries for colonial use were often fitted with a winding drum on one of the axles which was used for pulling the vehicle out of deep ruts and holes, and was also useful for other hauling purposes. Lurries were shown running on sand and on snow in many parts of the world, and the impression left on the listeners' mind was that in the matter of heavy motor traction on roads the United Kingdom is a long way behind many other parts of the world, a condition of things due largely to the grandmotherly Act of 1896. The lecturer concluded with the following comparison between the cost of carrying goods by means of a motor lurry and horse haulage; horse haulage varies, of course, considerably in different districts and under varying conditions, but as an average it may be taken at about *8d.* per ton mile.

Assume that the goods have to be transported a distance of 19 miles, and that a steam lurry is contemplated at a price of, say, £665—

	£	s.	d.
Interest on capital, 4 per cent.	26	12	0
Depreciation, 10 per cent.	66	10	0
Repairs and maintenance	52	0	0
Driver, at 35*s.*	91	0	0
Coal, 50 tons	65	0	0
Oil and stores	10	0	0
	£311	2	0

Say that the total inclusive annual expense is £310.

The steam wagon will carry 4 tons, and will make one round trip per day on 5 days a week, returning with, say, 2 tons of empties. That is 4 tons carried 18 miles out and 2 tons carried 18 miles home (6 tons carried 18 miles) each day, or a total of 6 × 18 × 5 = 540 net ton-miles per week of five running days and one cleaning day. In a year, allowing a fortnight annually for general overhaul, this will amount to 50 × 540 = 27,000 net ton-miles, and the cost, therefore, of carrying one ton one mile will be—

$$\frac{\pounds 310}{27{,}000} = 2{\cdot}75d.$$

A comparison of this figure with that arrived at in a similar manner for the present methods will show the economy, or otherwise, of the steam wagon.

But it should be observed that under most usual circumstances a trailer may be taken with a 4-ton wagon, and the useful load carried may thus be increased to about 6 tons, with a corresponding diminution of the total expense per ton-mile.

A discussion and the usual votes of thanks followed.

THE MANUFACTURE AND USE OF PNEUMATIC TYRES.*

Mr. Siddeley, in opening his paper, reminded his audience that the question of the pneumatic tyre was one that was always with us, as it constantly affected our pockets and our pride. Although, he said, there was no reasonable likelihood of ever getting a perfect tyre, yet year by year we were advancing along the road of improvement, and he proposed simply to discuss the stage which we had now reached, in the hope that subsequent discussion might not be altogether fruitless. He considered a slight knowledge of the manufacture of a pneumatic tyre was to the advantage of the owner of a car to enable him to get the best results from its use. A very considerable proportion of tyre troubles could be avoided if the owner of a car were conversant with certain elementary principles of tyre construction. The tyre manufacturer had two important problems before him, primarily to manufacture a casing, or air restraining portion of the tyre, which would satisfactorily accomplish the duties it was called upon to perform, and, secondly, to so blend a mixture of indiarubber, which when vulcanised would ensure the indiarubber and the canvas becoming homogeneous, and at the same time be capable of withstanding the friction created during the running of the car ensuing from the driving effort. He said the casing was composed of cotton cloth made of long fibre yarn. "Sea Island" and Egyptian yarn, which had the longest staple, being the most favoured. In the early days linen was used for this purpose as being stronger. What was required, however, was not mere strength but flexibility, linen casings invariably cracking at the point of flexion on account of the internal bending strain of the tyre. This point occurred a little above the halfway point on the walls of the tyre indicated by a slight flattening out, and a sharp bend as the tyre goes round from the point where it is in contact with the road to the walls. That point was the point of danger in all pneumatic tyres, as there was a constant saw-like action going on there. In preparing the cloth, the greatest care was required so that it was kept quite dry, when it first had to go through a "frictioning" process. This consisted of thoroughly impregnating the cloth with rubber solution. "Spreading" the canvas with solution was quite useless, as this process did not force the rubber solution into the folds of the canvas sufficiently as in the case of "frictioning." Spreading answered for cycle tyres, but not for motor tyres. The canvas being spread was then cut into diagonal strips of tyre lengths which had been cut across the threads at practically an angle of 45 degrees to enable the canvas to adapt itself to the bridge shape. The canvas cut in this manner prevented the tyre rolling from side to side when fitted to the wheel. If cut on the straight it would roll from side to side and at a considerably greater loss of power. Canvas cut diagonally gave short strands anchored on opposite sides of the rim and tangentially, and so a direct resistance to side pull. In constructing a casing the canvas had to be stretched on the tread and the wrinkles which developed at the sides smoothed out. The complicated process of forming the bead of the cover was done in the same operation. The bead was composed of hard rubber run through the die, and was like all the rubber used in the construction of the tyre, of a vulcanising mixture. The strength of the tyre entirely depended upon this casing. The number of folds of canvas in the standard makes of tyres were three of light cloth for voiturette tyres, three of heavy cloth for light cars, four for ordinary touring cars, and five for heavy touring cars.

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*Excerpt from a paper read by Mr. J. D. Siddeley at the Automobile Club, February 25th.

Mr. Siddeley next dealt with the manufacture of the rubber from its raw state until ready for fitting to the casing. The blocks of raw rubber, after being cut into small pieces, were then boiled to remove all impurities and dust. The impurities consisted mainly of stones, gravel and dirt, although other varieties of impurity, including knives, corks of rum bottles, and other evidences of the "white man's burden" that had penetrated to the distant parts from which the rubber came. After being boiled the rubber was passed through heavy rollers having rough surfaces, which transformed the blocks into crinkly looking sheets. The rubber was then taken to the drying room, where it remained until all moisture had been extracted. After being dried it went to the mixing room, where sulphur was added for vulcanising, together with other ingredients, to assist this process or to toughen the rubber, or to cheapen its quality. It was then taken to be calendered. The calender consisted of huge hollow rollers heated by steam, the rubber being spread on sheets in thicknesses as required. It then went to the cutters-up, where it was cut into the necessary strips ready for the tyre-makers proper. In moulding, the greatest skill was required to accurately fill the mould to meet the requirements of the varying type of tyres required. The tyre being formed into a complete cover was then ready for vulcanisation. After being cured by means of heat applied through the agency of steam, the tyre was taken out of the mould, forced off the "former," and was thus complete, beyond the necessary trimming. Tyres with a tread had to undergo a further cure in which the tread is built up separately, and after being solutioned to the casing the whole cover was wrapped upon a suitable "former" with canvas to secure the tread during the second process of vulcanisation. The border line between a properly vulcanised tyre and an over vulcanised tyre was very fine. This gave rise to a danger in tyre repairing. If the tyre was sent to a reputed firm of tyre manufacturers they would probably decline to repair it, knowing full well that it could not give much service after such repairs. If, however, sent to many so-called pneumatic tyre repairers, having no reputation as tyre manufacturers to maintain, it would be simply repaired according to instructions with very unsatisfactory results. He warned users that it was a most difficult matter to satisfactorily repair used tyres.

Inner tubes were made on two systems. One by putting the mixed indiarubber into a machine much resembling a sausage machine, from which the uncured rubber issued through a suitable die in the form of a tube. In the other system, sheets of mixed indiarubber were cut up into strips, put on to a tubular mandril, and joined up by wrapping them with canvas. He thought the manufacture of indiarubber required the use of more steam than almost any other industry, as it was the heating agent for the curing of all rubber.

On the screen Mr. Siddeley exhibited a picture of one of the boiler houses of the Continental Company's works in Hanover. He stated that it was only to such firms and other houses in an enormous way of businees that one could look for developments of the industry, owing to the enormous expense incurred in experimenting. He did not say that no good tyre could be made by other established houses, but the difficulties in front of the small manufacturer were very serious.

He then referred to the new Palmer Cord Tyre, in which the primary principle was embodied in the method and manufacture of the casing. Instead of canvas, there were only two layers of cord, each passing over from side to side of the rim in transverse diagonals, so that the two layers of cord lie at right angles to one another, thus avoiding many difficulties already mentioned in connection with the ordinary canvas casing. In previous attempts to make a cord tyre the additional circumference on the tread of the tyre, to which he had already referred, had resulted in an open space being left in the tread while the cords had lain quite close at the sides. In the new Palmer tyre this difficulty had been got over by the simple expedient of using elliptical cord, which stood on its sides at the edges, but was turned over to the flat on the tread.

He thought that a tyre of this construction was less open to the attacks of one of the great enemies of motor tyres—friction—than the ordinary type, for the simple reason that there were only two layers between which the friction could arise, instead of four or five. What this friction meant had been demonstrated by some tests made by the Palmer Company. Two tyres were run on a testing machine, both tyres having been inflated to a pressure of 80 lb. to the square inch prior to the test. At the end of fifteen minutes' running the pressure of the ordinary tyre had increased to 100 lb to the square inch, while that in the Palmer tyre had only risen to 90 lb. per square inch. He thought this clearly demonstrated that the heat generated in the new form of tyre was less than in the old one. At the same time, in case any of his hearers were tempted to make rash calculations, and estimate that their ordinary tyres after four or five hours' running would have developed a temperature considerably over boiling point, he would add that the test on the testing machine was more severe than that of road use. As an item of interest, some experiments had shown that the heat developed in a tyre which had been running for two or three hours on the road might reach as high as 185 deg. Fah. Further, there could be no question as to the increased resiliency of such a tyre. There must be a greater comparative advantage from the point of view of comfort and speed between this tyre and an ordinary tyre, than there was between the fabric cycle tyre and the old type canvas cycle tyre, as the tyre built up of several folds of canvas must palpably absorb more power, so that it seemed to him that this novelty made a distinct step forward in tyre construction. On the other hand it had not been possible to thoroughly test this tyre in practice as to its puncture-resisting abilities. He had seen tyres which had been driven some 2,000 miles, and were still in as relatively good condition as the heavier tyres might be at the same distance, but we could not really arrive at a conclusion regarding this till after a lengthened experience on the road.

Mr. Siddeley referred to the important matter of the provision of an effective non-slipper and protector, and said that he hoped that some valuable results might come of the Versailles Anti-Skid Trials which were then in progress.

In concluding his paper, he warned users not to be led away with the idea that many folds of canvas necessarily meant strength. Secondly, to beware of tyres having wrinkles on the inside of the cover. Such a tyre was badly made, and certain to bring trouble sooner or later. Thirdly, never to purchase tyres having fat edges, that is to say, in which the lips bedding in the rim did not slope away to a knife edge. If they did not slope away in this manner the movement of the tyre would cause the air pressure in the tube to force out between the beads, and a nip and a burst were certain to ensue. Regarding tubes the endless variety were always uncertain, as the best makes must always have thick and thin patches, and that was their vital defect. He preferred, personally, red tubes instead of grey ones, solely because one could see at a glance whether the tube had been nipped in any way. There was, however, no difference whatever between the qualities and properties of red and grey rubber. Finally, in the use of tyres, he advised every motorist to stop and repair any serious cut immediately he noticed it. Also to always carry a supply of the rubber and canvas gaiters. It was easy to lace one of these round the tyre and so avoid what might really be a serious breakdown. Last of all he urged everyone only to deal with firms of repute in the tyre trade. There were certain firms who professed and called themselves tyre manufacturers and repairers who were utterly unworthy of confidence, and only those houses whose reputation was known and stable should be entrusted with the patronage of those who relied upon them for what was, after all, one of the most vital spots in the motor car—its tyres.

Scottish Automobile Club (Western Section).—Last Monday evening, in the Windsor Hotel, Glasgow, Mr. J. M. Ross presiding, a discussion took place, introduced by Messrs. John Adam and J. Hunter Steen, on "The Cost, Up-keep, and Care of an Autocar." Mr. Adam opened the discussion by explaining that he appeared as representing Mr. Smith, who wrote the paper, and Mr. Steen, who supplied the figures, but it appeared afterwards that part of the data was furnished by Mr. Seligmann for purposes of comparison. Mr. Adam began by expressing the opinion that the cost of a car was a subject that must be considered entirely from the individual point of view—the roads he intended to use, whether he intended to travel much or little, and the number to be carried. Speed also was a very important factor, and altogether it would be useless to attempt to lay down any definite lines on the subject. He could, however, supply figures regarding the cost of a motor house—a considerable item of initial expenditure. A builder had supplied him with the following figures for a house 18 ft. long and 9 ft. wide, having a concrete pit 6 ft. long, 3 ft. wide, and 2 ft. 10 ins. deep. This house could be built with concrete floor and heating stove for about £40. With regard to up-keep, he was in a position to give the exact cost of running two cars of about the same power—a 10-h.p. Wolseley, belonging to Mr. Steen, and a 12-h.p. Wolseley, belonging to Mr. Seligmann. Mr. Steen's distance had been 7,065 miles, during which he had used 346 gallons of petrol, giving a distance of about 20½ miles per gallon of petrol. His running had been over some of the worst roads in Scotland, which usually used up pneumatic tyres in a very short time, but in his case they came back in fairly good condition. His total cost, including petrol, oil and grease, tyres, repairs, stabling, and licence, amounted to £80 14*s*. 6*d*., giving a total cost of up-keep of 2·71*d*. per mile. Against this Mr. Seligmann's total for 5,000 miles worked out at 2·84*d*. per mile. The details per mile were :—

	Seligmann.	Steen.
Petrol	·76*d*.	·77*d*.
Oil and grease	·099*d*.	·099*d*.
Tyres	1·332*d*.	·86*d*.
Stabling	·417*d*.	·56*d*.
Current	·016*d*.	——
Repairs	·212*d*.	·42*d*.

It will be seen that these items do not include maintenance, and charging of accumulators in Mr. Steen's case, nor is there anything shown by either for depreciation, a very serious item. A still more important factor which does not appear is that both gentlemen look after their own cars, and, while having to buy the parts, execute most of the work themselves.

In the discussion which followed, Professor Galt brought out two useful points. In reply to a complaint by Mr. Adam regarding the difficulty of clearing the water fittings of water during frost, he stated that a mixture of water and 20 per cent. glycerine would not freeze except at lower temperatures than experienced in Scotland, but the useful point was that such a mixture had no corrosive effect on any metal used in motor car construction. On the question of heating, the motor house, he pointed out that a tank filled with boiling water would give off sufficient heat while cooling to keep an ordinary sized motor house above the freezing point for a whole night.

Hertfordshire Automobile Club.—The committee have decided to affiliate with the A.C.G.B.I. under Scheme II.

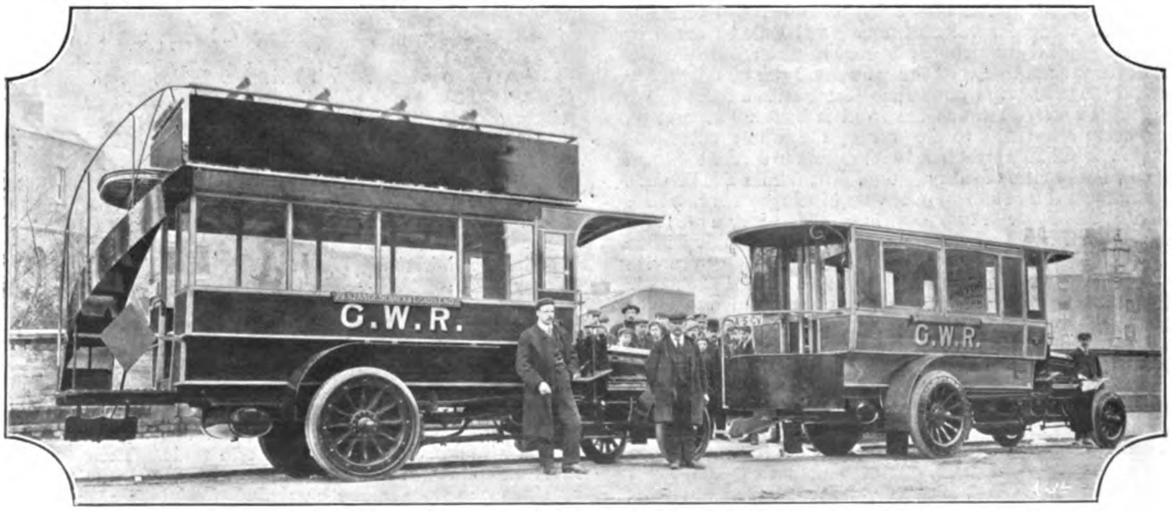
Active steps are being taken by the club to oppose the application for the 10-mile speed limit put forward to the L.G.B. by the St. Alban's Corporation.

The views of the local candidates for the County Council as to automobilism generally have been obtained by the club, which are reported to be favourable, a distinct objection being held to the underhand practices of motor-trapping policemen on deserted roads.

A grand opportunity for a headline, "Fatal Motor Car Accident," was missed last week, when at an inquest upon Thomas Price, a coach trimmer, of Saltley, it was found that Price died from blood poisoning, the result of driving a tin-tack into his finger-nail when padding the back upholstery of a motor car.

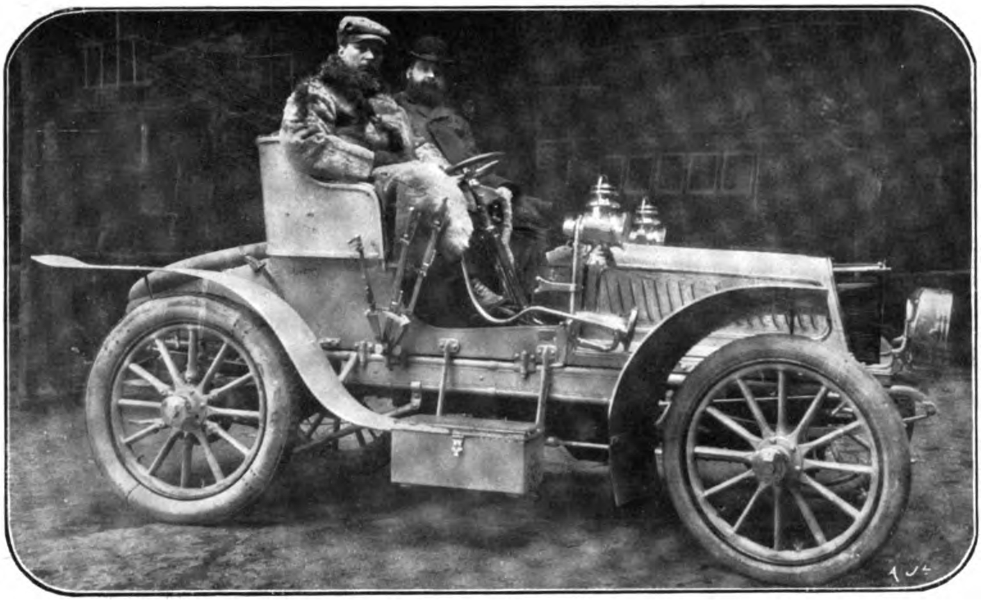
MORE RAILWAY AUTOMOBILISM.

Almost every week sees the inauguration of a fresh motor car service by one or other of our great railway companies, and now the Great Western Company, which in every respect shows itself singularly progressive, has arranged a service between their Slough station and the rather out-of-the-way country town of Beaconsfield—a spot rendered particularly familiar to motorists by the Dashwood Hill competitions. The new service will be heartily appreciated by the inhabitants of Beaconsfield, as the town is unprovided with railway accommodation of any kind, the nearest station (which is on a cross-country line) being at High Wycombe. The railway company has adopted 20-h.p. Milnes-Daimler omnibuses for the service, and the distance from Slough to Beaconsfield is covered in 45 minutes. The route is replete with historical and literary associations, Stoke Poges of the "Elegy" lying just off one of the available roads, and Beaconsfield itself being intimately connected with the last days of Edmund Burke. The advent of the motor 'bus on this out-of-the-way district, so reminiscent of the eighteenth century, gives food for thought. It is satisfactory to find in its introduction an evidence of the progressive spirit of a great railway company, and a proof that the railways are abandoning any attitude of hostility that they may at one time have entertained towards the new movement, and are recognising in the motor vehicle one of their best possible allies.



Two of the new Great Western Railway's Milnes-Daimler Omnibuses which the Company are putting into regular service.

RACES, RECORDS, AND TRIALS.



THE VERSAILLES ANTI-SKID TRIALS.—The President of the A.C. Seine-et-Oise, under whose auspices the Trials were held, on his car.

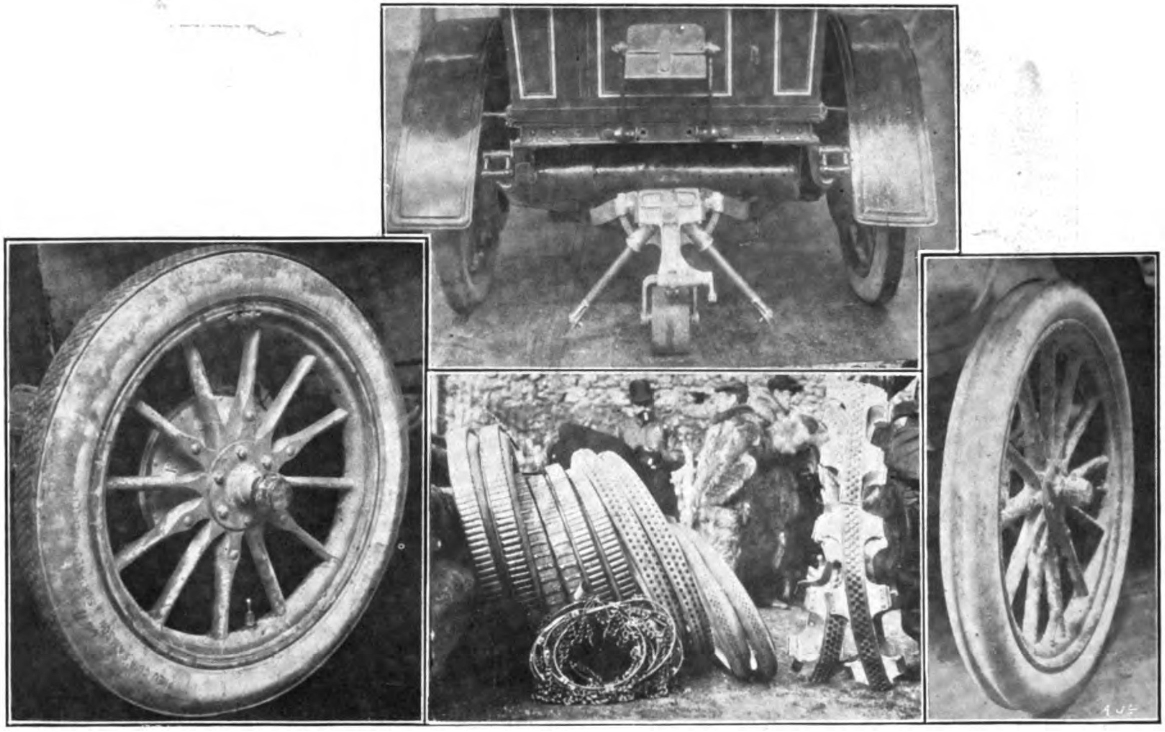
ANTI-SKID TRIALS AT VERSAILLES.

COMMENCING on Wednesday last week with the weighing of the cars and preliminary tests, these important trials concluded on Sunday, when a series of runs and stoppages were made by the cars over specially-prepared roads covered with greasy matter. Exceedingly valuable data ought to be the result of this series of tests when the judges have concluded their deliberations and the various experiences are officially recorded.

In all 26 cars took part in the trials out of 34 entered, almost every known anti-skid device being represented. The original programme was not adhered to strictly, although in the main it was gone through as originally published. After the weighing formalities had been concluded, the cars were required to climb the Picardie Hill on the top speed without the anti-skid devices attached, note being taken of the distance up the hill attained before the engine stopped. Each car had then to repeat the performance with the anti-skid device fitted, and the point reached under those conditions formed a basis of comparison for ascertaining the loss of efficiency in propulsion caused by the safety device. Whilst in four cases the cars surmounted the top of the hill under both tests, it was curious to note that in some instances the distance travelled with the device attached was greater than without it. In most cases the difference, judging by unofficial figures, was not very great. The times taken for fixing the different devices in place varied enormously—4 minutes in the case of the Parsons to 65 minutes in the case of the Clerget. Other devices which were quickly fixed were the Antidérapant H.D., Durandal, Fouilloy, Bergougnan, Samson, and Billet. On the 25th the first long run on the road took place, 191 kiloms. being covered by the competitors, the total distance run during the four days ending Sunday being about 800 kiloms. Several motor cycles were included in the competitors. Bad luck attended some of the cars upon which the devices were fitted, and special arrangements were made for these to finish their tests later. Throughout the weather kept fine, although very cold. Upon a few occasions some interference by the police was experienced, one zealous officer accusing a 6-h.p. car of having travelled at a speed of 38 miles per hour—an effort

VERSAILLES SIDE-SLIP TRIALS.—The third test in the Non-Skidding Trials of the Automobile Club of Seine-et-Oise was held in L'Avenue de Paris, over a prepared stretch, of which a winding track was marked out in a broad white line. This line the cars had to keep between their wheels, any deviation from it being duly recorded by the judges.

The Dubrulle.



The Sampson tread. **Gallus tyres (6), Bergougnan tyres (4), La Durandal (2), And Parsons anti-skid chains.** **The Eyquem grooved tread.**

VERSAILLES ANTI-SKID TRIALS.—A few of the competing devices.

enough even to make some of our Surrey trappers envious. The judges, anxious to test, under more prolonged conditions, the durability of the different devices, on the third day made an announcement that they would offer special prizes for cars which would enter for a long run after the trials, say from Paris to Nice, and back, under official observation. Several soon came forward to accept this challenge, including MM. Sampson, Chameroy, and Billet. During the later days of the trials, Mr. E. H. Cozens-Hardy and Mr. O'Gorman witnessed the tests as delegates of the A.C.G.B.I., and they were invited to join the jury in their observations, an act of courtesy much appreciated. On Saturday, several of the competitors retired from different causes, 21 of the original starters being, however, left in for the finish.

On Sunday, the vehicles were submitted to the final tests, which consisted of—

(1) Stopping the cars suddenly on greasy "pavé" by braking the wheels when travelling at about 30 kiloms. per hour, the distance being measured to where the car came to a standstill from the point where the signal to stop was given.

(2) The cars were then required to turn on a piece of greasy road, any deviation in the process from a white line being carefully noted by the judges.

(3) Tests were then made of the cars on a flat road on double bends when applying the brakes, any deviation by reason of side slip over the marked course being noted as before.

(4) The same test was repeated on a flat road as in No. 1 on "pavé."

The judges' awards are not expected for a short period.

In our illustrations are seen some of the devices which took part in the competitions, and the following are brief explanations of the principles involved.

The construction of the Sampson non-skid tread, which we have described this week in connection with the Crystal Palace Show, is clearly indicated in one of the accompanying illustrations. The chrome leather band forming the tread, from which the steel studs project, is fixed to a thinner foundation of the same leather which is vulcanised to the rubber tyre.

In the Bergougnan tread steel studs are also used, but the band in which they are fixed is of rubber-fabric formation instead of the leather more usually adopted with this kind of non-skid.

The Eyquem skid preventer is among that class which relies on some peculiar section of the tread of the tyre for its anti-skidding properties rather than the addition of a leather or metallic attachment. As will be seen from the illustrations, the Eyquem consists of a tyre having two distinct treads separated by a deep groove. The principle is similar to that followed in the construction of the twin solid tyres which were to be seen at the Crystal Palace Show.

The Dubrulle non-skid is a device apart. It consists, as will be seen in the illustration, of a mechanical attachment, which hangs down from the back of the chassis. This attachment comprises a pivoted framework carrying a small wheel and two downwardly-projecting arms, the ends of which latter are provided with sharp-edged discs. These arms are only kept off the ground so long as the small wheel runs vertically under the pivot of its frame. Any side-slip, therefore, since it tilts the framework, immediately puts one or other of the arms in contact with the road, in which position the sharp-edged disc is relied on to prevent further sideways motion. The small wheel is independently pivoted from the frame carrying the arms in order to allow it to follow the contour of the road. It has no independent lateral play, however, so that any relative sideways motion between the rear road wheels and the small wheel is of necessity accompanied by displacement of the framework from its normal position, and the engagement of one of the arms with the ground.

The Gallus device was described by us in our issue for January 31st, 1903, p. 125, and the Parsons on January 10th, 1903, p. 42.

Side-slip Competition of the Automobile Club, March 25th to 30th.—The entries closed on Monday last for this event, and with commendable promptness the technical secretary of the club has issued the following full list of entries :—

Mr. Mark Vivian, 70, Duke Street, Chiswick.

The Wilkinson Tyre and Tread Company, Chapel Hill Mill, East Parade, Huddersfield.

The Continental Caoutchouc and Gutta Percha Company, 64 and 65, Holborn Viaduct, E.C.

Mr. Alexander Nicholson (2 cars), 29, Mary Street, Dublin

Commander Chas. T. Scott, Sharrow Grange, Sheffield.
Rourke and Horsburgh, 9, Hawes Road, Bromley, Kent.
Wm. Cross and Sir Chas. Ross, Kittery Court, Kingswear, S. Devon.
Mr. H. Taylor-Stephens, 2, Quays Court, Carmarthen.
Sainsbury's Anti-Skidders, Limited, Buchanan Buildings, 24, Holborn.
Mr. Henry S. H. Cavendish, Blenheim Lodge, Abbey Road, N.W.
Mr. E. Midgley, 38, Hyde Park Gate, W.
Mr. Wm. Hunt, Montagu Motor Works, Kettering.
Mr. Samuel Butler, Henbury Hill, Westbury-on-Trym, near Bristol.
Mr. W. Maitland Edwards, 34, Victoria Street, S.W.
Gare Patent Tyre Company, 5, Castle Street, Liverpool.
M. Henri David, 81, Rue Jauffray, Paris.
Grose, Limited, Pike Lane, Marefair, Northampton.
Mr. W. H. Manning, Monument Buildings, Monument Square, E.C.
Mr. John Harrington, Madeira House, Bristol Road, Brighton.
Parsons Non-Skid Company, 175, Manor Street, Clapham, S.W.
Wm. Jenkinson and Co., 44, London Wall, E.C.

GLASGOW-LONDON RELIABILITY TRIAL.

The rules and conditions in this "Non-stop" run, organised by the Scottish Automobile Club (Western Section), are now to hand. The date fixed is May 19th and 20th, and the competition is only for tourist cars proper, fitted with ordinary touring carriage bodies, as supplied by the manufacturers in the ordinary course. Only one car of any specific make and type can be entered in each class, and no cars will be considered of different horse-power unless the cylinder capacities vary by at least 15 per cent. Preference will be given to entries by (1) a maker, or (2) a nominee of a maker. At present there are to be four classes, viz. :—(a) 1-cylinder petrol vehicles, (b) 2-cylinder petrol vehicles, (c) three or more cylinders, (d) steam cars. The latter class may be sub-divided later.

The trial will be practically a non-stop run, beyond the official stops for meals and the rest at night, no repairs or adjustments being permitted except under penalties. The entry fee is 10 guineas per vehicle, and entries must be lodged with the Honorary Secretary, Mr. R. J. Smith, C.A., 59, St. Vincent Street, Glasgow, not later than April 13th. The committee may allow a further 14 days for entry at double entrance fees. Marks will be deducted for every minute any competing car is at rest other than official compulsory stops. Maximum and minimum times for the various stages will be allowed, and violation of the latter, if due to deliberate intention, may render the driver of the vehicle liable to disqualification. Times will be recorded on a hill forming part of the road during the second day's run for the purpose of the medal awards. A full complement of passengers must be carried, or an equivalent weight of 11 stone in lieu of each passenger. Fuel and water tanks must be of the ordinary recognised size and capacity. Certificates will be issued to each vehicle completing the trial, which will state the number of marks gained and the deductions for stops, tyre troubles, the result of the hill-climbing test, &c.

A non-stop gold medal in each class will be awarded. In the event of two or more vehicles in any class gaining full marks the award of this medal will be made to the car making the best results on the hill-climbing test at Woodcock Hill, near Elstree. The following formula will be the basis of the marks given for this hill climb :—

$$\frac{(w \times 60 \times L) + (W \times h) + \frac{(W \times v^2)}{2}}{a \times n \times s \times \left(\frac{G}{D\pi}\right)}$$

in which

w = Laden weight of car in tons.
L = Length of hill.
W = Laden weight of car in lbs.
h = Height of hill.
v = Velocity in feet per second.
a = Area of piston in sq. ins.
n = Number of cylinder.

s = Stroke in inches.
G = Gear ratio or number of revolutions of engine for one revolution of road wheel on lowest gear.
D = Diameter of road wheel in feet.

This formula will not apply to steam cars, and the results of the climb will only be used to determine medal awards in the event of equality of marks.

Vehicles will start from Glasgow on May 19th at 5.30 a.m., and from Leeds on May 20th at 6 a.m., and times in London will be taken upon arrival at the Automobile Club, 119, Piccadilly. Competing cars must be submitted for inspection in Glasgow on the day prior to the trial, not later than 9 a.m., and it is proposed that the cars should be on view prior to the start.

Forty minutes' rest will be allowed at Penrith and Stamford, and in addition ten minutes will be allowed for replenishing fuel and lubricants at both these points and also at Leeds. No adjustment or repairs will be allowed, however, except during running time, and this will commence one minute after the order to start the engine has been given from each stopping point. The route will be on the first day from Glasgow to Leeds (211⅞ miles), *via* Douglas Mill, Beattock, Gretna Green, Penrith, Shap Summit, Kirkby Lonsdale, and Skipton. On the second day the route will be from Leeds to London (201⅞ miles), *via* Doncaster, Tuxford, Grantham, Stamford, Biggleswade, and Hatfield. Total mileage for the two days, 413¾ miles.

GORDON-BENNETT ITEMS.

Schleswig-Holstein has, it is reported, been finally selected for the German Eliminating Trials, starting from Lubscher Brunnen, over a circuit of about 50 kiloms.

MM. Théry, Stead, and Caillois are definitely announced to drive the G. Richard Brazier cars in the French Eliminating Trials.

The Fiat cars for Italy will be in the hands of MM. Storero, Lancia, and Cagno.

In spite of all the influence brought to bear upon M. Emile Combes, the French Minister of the Interior, he refused his sanction for the eliminating trials for the French cars to be held on the Argonnes Circuit. Indignation was rampant amongst the makers and supporters of automobilism at this decision, and a meeting was at once called of the leading French firms, to consult as to the best course, under the circumstances, to adopt. An appeal to the Senate was recommended and carried out on Tuesday. After long deliberation, the Senate unanimously accorded the necessary permission, and joy again reigns supreme in French automobile circles. Had the Senate refused sanction, and the A.C. of Belgium declined to extend their date of March 1st for receiving notice from the A.C. de France to run the French trials on the Belgian Ardennes Circuit, the French club would have been in a very unenviable position in selecting their representative cars. In the event of the Isle of Man course being arranged for the British trials, might it not, should any hitch occur, be a sportsmanlike and graceful act of courtesy to offer the use of this circuit to the French club?

On Saturday last Mr. J. W. Stocks made a non-stop run from London to Edinburgh with a 2-cylinder 12-h.p. De Dion car. Starting from Regent Street at 4 p.m. on Friday afternoon with three passengers up, he arrived in Edinburgh at 5 p.m. on Saturday afternoon without stopping the engine from first to last. The route taken was through Hatfield, Biggleswade, Doncaster, Darlington, Durham, Newcastle, Berwick, Haddington, and Musselburgh, the distance being 398½ miles. During the greater part of the drive the weather was very severe, deep snowdrifts being encountered between Newcastle and Berwick.

L'Auto announces that it proposes holding kilometre speed trials on the Dourdan Road towards the end of June next.

In connection with Mr. W. K. Vanderbilt, junior's, Cup, which he has offered to the A.C. of America for competition, it is reported the distance of the race will probably be about 300 miles, the roads of Long Island being, if possible, used for the event.

THE win attributed to De Bellemare last week on a 14-h.p. Renault touring car, in the Coupe Sneyden, has been cancelled, in consequence of some irregularity in the entering of the car. The winner has, therefore, been adjudged to be Baron J. de Crawhez with a 24-h.p. Vivinus touring car.

IT is announced from Barcelona that the Tibidabo Hill has been scaled by Abadal, in 9 mins. 0⅕ sec., on a Bayard-Clement car. The hill is 6 kiloms. in length.

THE A.C. of America have postponed the date of their Industrial Vehicle Contest from March to April 4–9. They have also taken up the principle put forward for the Industrial Vehicle Trials of the A.C.G.B.I. for the present year, by which entrants in the contest will be "farmed out" to the American and Westcott Express Companies for the week of trial, and the vehicles will be placed by these Companies under actual working conditions day by day, transporting and delivering merchandise, produce, baggage, &c., from the various depôts of these Companies, exactly the same as the ordinary horse-drawn vehicles of the Companies. A careful record will be kept of each day's work, cost of running, &c., and awards will be made in each class for the best performance, based on the economy of operation in time and fuel, ratio of paying load, ton-mileage, and general reliability and availability for service. The classification will be on the basis of dead load carried, and all wagons of light weight, whether steam, gasoline, or electric, will operate in the same class. The following are the classes and the dead loads in each case to be carried :—(1). 1,000 lbs. or under; (2). 1,000 to 2,000 lbs.; (3). 2,000 to 3,000 lbs.; (4). 3,000 to 4,000 lbs.; (5). 4,000 to 5,000 lbs.; (6). 5,000 to 6,000 lbs.

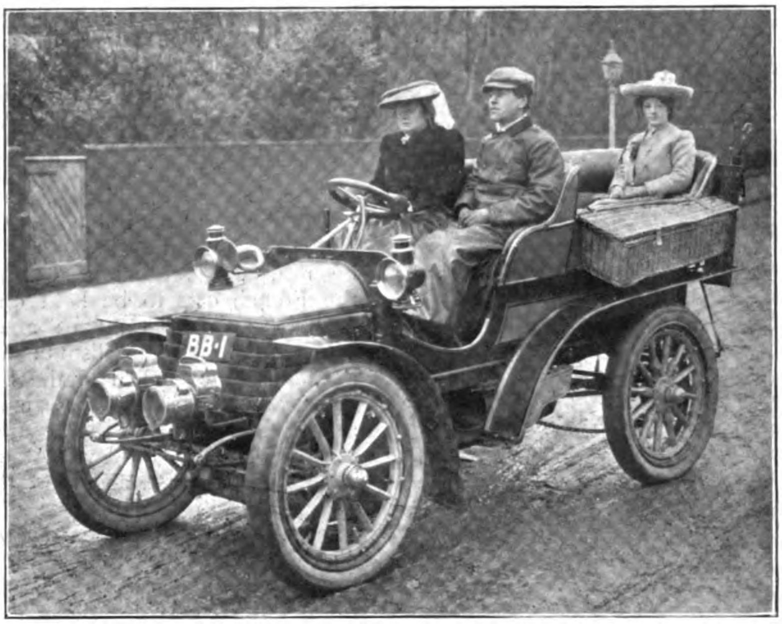
A REMARKABLE series of wins were scored by De Dion-Bouton cars at a road and hill-climbing event held on Feb. 21st, in Spain, on the Perdices and Galapagar hills. A 6-h.p. De Dion was winner in the 1st Category in 15 mins. 31⅗ secs.; in Category 2, two 6-h.p. De Dion cars secured 1st and 2nd places in 15 mins. 42⅗ secs. and 15 mins. 43⅕ secs. respectively; and in Category 3, a like honour fell to two 12-h.p. De Dion cars, in 12 mins. 16⅘ secs. and 12 mins. 51⅗ secs. respectively. The winner in Category 4 was a 24-h.p. De Dietrich car in 9 mins. 51⅕ secs.

THE hill-climbing contest arranged by the A.C. of Marseilles, at the end of last month, brought together a huge crowd of interested spectators. The point selected was a kilometre on the boulevard Perier, the gradient in places being 1 in 7. Out of 46 entrants 39 started, the following being the best times :—Category 1.—1 to 12-h.p. cars, Roustant (12-h.p. Rochet-Schneider), 2 mins. 15 secs.; Meyer (10-h.p. Peugeot), 2 mins. 30 secs. Category 2.—Above 12-h.p. cars, Rougier (45-h.p Turcat-Méry), 1 min. 31 secs.; Lenardt (24-h.p. Turcat-Méry), 2 mins. 5 secs. Category 3.—Closed vehicles, Gras (20-h.p. Turcat-Méry), 2 mins. 15 secs.; Benet (18-h.p. Peugeot), 2 mins. 20 secs. Under a special handicap formula employed, the winner in each class has been announced as follows :—Category 1.—Meyer (10-h.p. Peugeot), time 2 mins. 30 secs; Category 2.—Cotte (20-h.p. Pilain), time 2 mins. 17 secs.; Category 3.—Gras (20-h.p. Turcat-Méry), time 2 mins. 15 secs.

A "criterium" for motor bicycles was run off at Turin, on Feb. 23rd, by way of a finish to the Automobile Exhibition, over a distance of 180 kiloms. In the ¼-litre machines, Carbone, on a Buchet, was first, with 175 points, and Cedrino, with a Quagliotti, second, 152 points. In the ⅓-litre class, the winner was Giuppone, with a Peugeot, 193 points, in 4 hrs. 32½ mins., the second being Pechacek (Republik), 189 points, in 4 hrs. 45½ mins.

A PROPOSITION is under consideration for holding quarterly trials for motor cycles by the Auto Cycle Club.

AN International Motor Bicycle Competition will be held in Italy in May next at the Porta Salaria Velodrome in Rome, over a distance of 100 kilometres.



A continuous run from Newcastle to London by motor, stopping only one night on the road, is a feat with which any lady driver may feel satisfied. Our illustration shows Mrs. Dunn on her arrival at the Crystal Palace Show, after having driven her 10-h.p. Wolseley Car the whole distance, stopping only for the night at Newark. Mrs. Dunn desired to join her husband at the Show, and it is significant that the idea of going by rail was never once entertained, the car being taken out as a matter of course. Mrs. Dunn, accompanied by her daughter and a chauffeur, started at 9 o'clock on Thursday morning, and arrived at Newark the same evening, London being reached at 5½ p.m. on the Friday (February 19th). Mr. Dunn has also been an ardent motorist for several years and enjoys the distinction of holding the No. 1 licence for the Newcastle district.

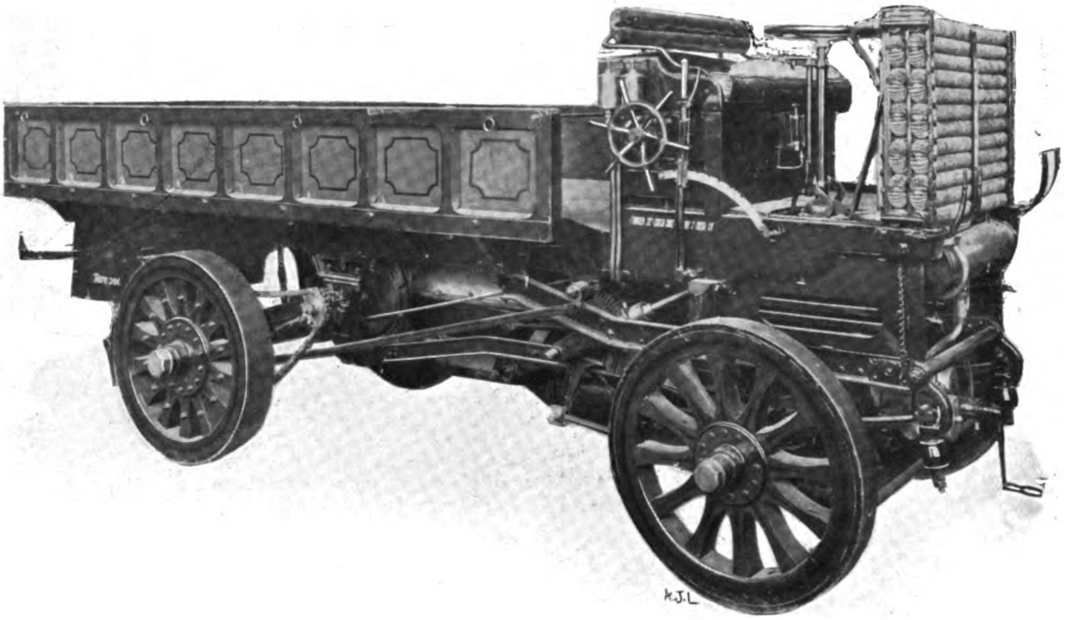
In connection with the Auto Cycle Club's Side-slip Trials, it has been decided that there shall be two classes, viz., for (*a*) machines with one track, (*b*) machines with two or more tracks. The entrance fee for each device is to be five guineas.

It has been decided that in view of the existing speed limit the Auto Cycle Club do not consider it advisable to recognise attempts at record on the road between Land's End and John o'Groat's.

THE EDINBURGH MOTOR AND CYCLE SHOW.

FRIDAY, 26th February, saw the doors of Edinburgh Waverley Market thrown open to the public for this Motor Show. In the evening the visitors were numerous, and this has since been a daily experience.

So far as mechanically-propelled vehicles are concerned, the Show is well worth seeing. About seventy exhibitors are represented, and the motor-driven machines, including cars and cycles, number nearly 140, of which more than half are cars.



A 5-ton Petrol Lurry, designed for drawing a trailer with a further load of three tons, which was shown at the recent Exhibition by the Cadogan Garage and Motor Company, of Chelsea. This vehicle has an engine which develops 34-b.h.p., and the change-speed gear provides for four forward speeds and a reverse. The rear wheels are driven by side chains from a differential countershaft.

Of the cars shown, the majority are of British make, about 62 per cent. of the total being of home manufacture, the makers principally represented being the Wolseley Company, with 5 cars; the Napier Company, 5; the Hozier Company, 4 Argyles; the Lanchester Company, 4; the Humber Company, 4; the Albion Company, 3; Stirlings, 3, &c.; while the foreign element is represented by Peugeots, 7; Panhards, 4; De Dions, 3; Cottereau, 3, &c. So far as cycles are concerned, of the 60 odd present, only a few, certainly less than a dozen, are foreign, and when one considers that only a few years ago this form of machine was represented, at least in Scotland, almost exclusively by Werners and Minervas, the conclusion is forced on us that, at least in cycles, the British industry is more than holding its own.

The principal exhibitors are:—J. Croall and Co., Limited, of Edinburgh; Rennie and Prosser, Limited, of Glasgow; the Caledonian Motor and Cycle Company, Limited, of Aberdeen; the Scottish Automobile Company, of Edinburgh; Thomas Shaw, Dundee, Limited; the North British Motor Company, of Glasgow; Laurence Bell and Co., of Peebles; the Mo-Car Syndicate, Limited, Paisley, &c. The principal exhibits of motor cycles are:—Quadrants, 10; Excelsior, 5; Ariel, 5; and Rex, 5; the total number of makes being about 20.

An interesting feature of the Show is the number of chassis on view, besides working parts, such as the Lanchester worm-drive, the Albion magneto, and others, intended for the instruction of the uninitiated. The Show closes on Saturday, 5th March.

CORRESPONDENCE.

*** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letter intended for insertion, or containing queries.*

THE REFORM COMMITTEE.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—For the information of your readers I beg to state that Major Lindsay Lloyd's name appears in the *Car* this week as a signatory to the manifesto by mistake.

Yours faithfully,
JOHN S. MONTAGU.

March 1st.

PARIS OR LONDON?

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—In view of the extraordinarily successful Automobile Exhibition at the Crystal Palace, and the fact that it was of a far more International character than that held previously in Paris, or, indeed, any other Show yet organised, I think the time has come when every English manufacturer should cease to exhibit in Paris.

It is not advantageous to the English manufacturer to show his new models in Paris first, as that merely helps to increase the automobile prestige of France.

The French manufacturers, on the other hand, must show their models in England because the English market is at the present time one of the largest, if not the largest in the world, but there is no real necessity for England to go to France to show vehicles. I think, therefore, that the time has come for every English manufacturer to leave the French Show severely alone and to exhibit at one Show only in England. This show will be, as was the recent one, of a distinctly International character.

I shall be very pleased on behalf of the "Napier" to sign any document that the trade may think necessary to this effect.

Yours truly,
S. F. EDGE.

February 26th.

THE Hyde Rubber Works, Limited, of Woodley, near Stockport, desire us to state that they are in no way connected with the Hyde Rubber Company, of Hyde, against whom an action was recently brought by the Dunlop Rubber Company.

MR. PERCY W. NORTHEY has been gazetted Lieutenant of the Motor Volunteer Corps.

THE proposal to include motor bicyclists in the Motor Volunteer Corps has been approved by the War Office. The number will be limited to 40 members.

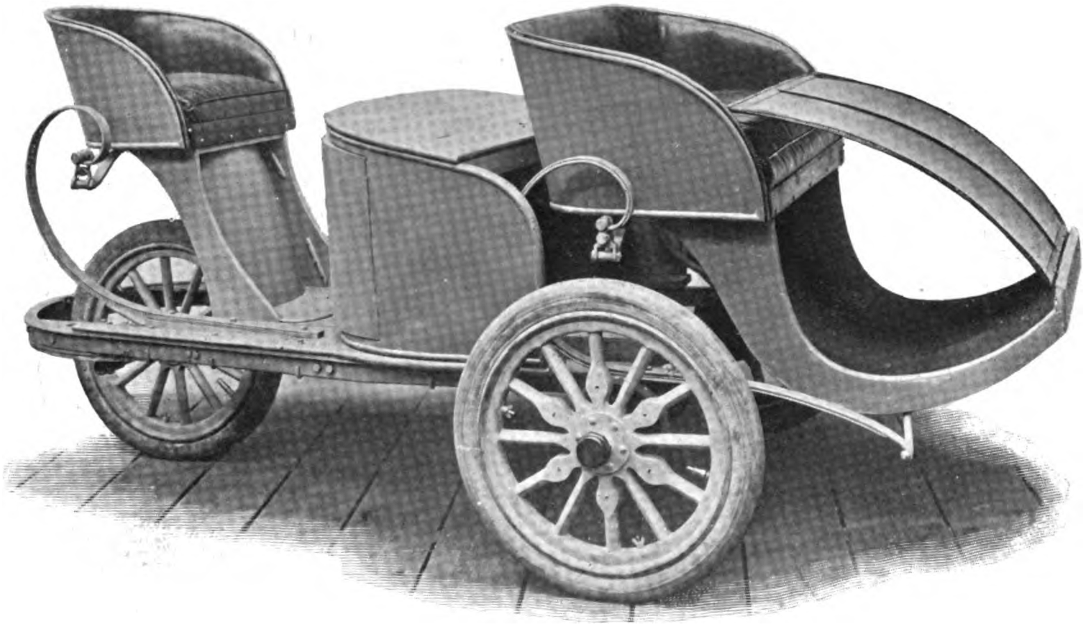
WE learn that Mr. H. T. Vane, who has during the past nine years been associated with the Dunlop Tyre Company, has now been appointed Secretary to Messrs. S. F. Edge, Limited.

WE are asked to mention that the change-speed-gear manufactured by the Langdon-Davies Motor Company, and described by us recently, is the joint invention of Mr. Soames and Mr. Langdon-Davies, and that it is to be known as the "Soames" Gear.

THE Annual General Meeting of the Automobile Club next Thursday, March 10th, will be held at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, at 5 p.m.

THE Great Eastern Railway is following suit with other companies by arranging to supplement its steamer service between Southwold and Lowestoft by a motor car service connecting these two towns.

THE Ivel Agricultural Motor has gained the further distinction of being awarded a Gold Medal at the Chester Ploughing Match held at Waverton, near that town, on the 17th of last month. This is the first occasion, we are informed, on which a competition of this kind has been open to mechanically-propelled ploughs, and we are glad to say the Ivel-drawn plough proved itself superior in every respect to any of its horse-propelled competitors. The Company have celebrated the occasion by breaking forth into verse, which, however, is not quite as good as the Ivel's performances in the field would warrant.



This peculiarly shaped 3-wheeled vehicle, in its partly finished condition, was exhibited by the Krupkar Company at the recent Show. It is called the "Morrison" Car, and has a 6-h.p. 2-cylinder engine which drives the front wheels.

THE employees of the "Locomobile" Company of Great Britain held their third Annual Dinner, on Saturday evening, the 24th ult., in the Horse Shoe Hotel. The chairman, Mr. G. J. Shave, was supported by Mr. Chas. Jarrott and Mr. Wm. Letts, managing directors of the Company, about forty-five of the employees being also present. The evening, which concluded with a musical programme, was in every way a most enjoyable one, and fully endorsed the characteristic speeches of Mr. Jarrott and Mr. Letts, in which they spoke of the happy relations existing between all members of the Company. There can be no doubt that gatherings of this nature, where officials and employees meet on a social footing for an evening of enjoyment, go far to round off the sharp corners produced by a purely business relationship, and are a very great factor in furthering the interests, not only of the company holding them, but of the automobile industry at large.

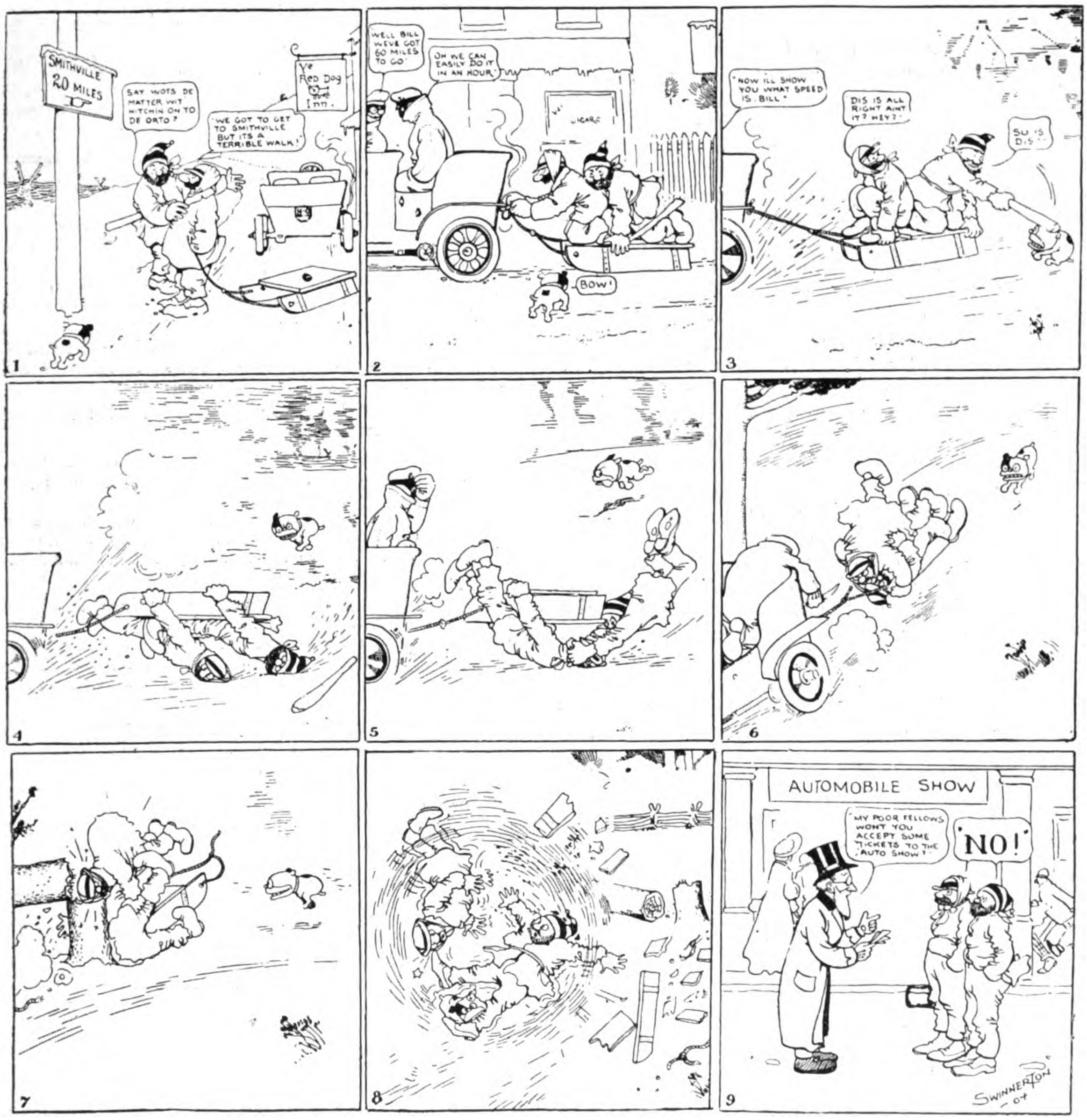
THE facilities given by many railways abroad is in striking contrast to the methods of our British companies. A reduction of 50 per cent. is offered on the French railways for the transportation of automobiles destined for the Nice Salon, whilst a reduction ranging from 10 per cent. to 20 per cent. is offered in connection with the transport of automobiles to the Vienna Exhibition.

COXETER AND SONS, LIMITED, of Abingdon and Oxford, have just opened a new garage and repairing establishment at Pembroke Street, St. Clements, Oxford. It is conveniently situated within a minute from the main London to Oxford road.

AUTOMOBILISTS and others who happen to pull up at the Black Swan, Pease Pottage, between Crawley and Brighton, should now find no difficulty in obtaining a cup of tea at that hostelry. The former tenant of the inn, who had conscientious objections to providing travellers with anything but intoxicating beverages, has been removed, apparently as the result of the opposition to the grant of the licence. An automobilist, it will be remembered, opposed the grant at the Licensing Sessions at Hayward's Heath on the ground that when calling at the inn he had been refused tea which he ordered. At the last sitting of the Licensing Magistrates it was stated that this anti-teetotal occupant of the hostelry had been removed, and the licence was accordingly granted. We trust that this will serve as a warning to other like-minded Bonifaces. There is much too great a tendency on the part of small innkeepers to look and act as if insulted whenever asked for the cup that cheers but does not inebriate.

"HITCH BEHIND!" OR THE RIDE TO SMITHVILLE

By Swinnerton


1
SMITHVILLE 20 MILES
Ye Red Dog Inn.
SAY WOTS DE MATTER WIT HITCHIN ON TO DE ORTO?
"WE GOT TO GET TO SMITHVILLE BUT ITS A TERRIBLE WALK!"
2
WELL BILL WEVE GOT 60 MILES TO GO"
OH WE CAN EASILY DO IT IN AN HOUR"
BOW!
3
"NOW ILL SHOW YOU WHAT SPEED IS. BILL"
DIS IS ALL RIGHT AINT IT? HEY?"
SO IS DIS"
4
5
6
7
8
9
AUTOMOBILE SHOW
"MY POOR FELLOWS WONT YOU ACCEPT SOME TICKETS TO THE AUTO SHOW?"
"NO!"
SWINNERTON -04

Motor, U.S.A.

THE F.I.A.T. Company has secured the Gold Medal at the Turin Exhibition, for the most artistic stand.

THE general accessories and furnishing dealers for cycles and automobiles have in France formed themselves into a Chambre Syndicale, under the title of "Syndicat des Commissionnaires pour les Fournitures Générales du Cycle et de l'Automobile."

IF the Selden patent combination, to which we have frequently alluded and which, in spite of the laughter of Europe, still threatens to convulse the automobile world in America, has done nothing else, it has caused our contemporaries, particularly in France, to unearth a most marvellous collection of antique motor vehicles. The latest discovery, but in point of time one of the earliest of these, was illustrated recently by our contemporary, *L'Automobile*, which reproduced a photograph of the Marcus car of 1873. Siegfried Marcus was a citizen of Vienna, and his vehicle was exhibited at the

Vienna Exhibition of that year. It was provided with a horizontal explosion engine, said to have been capable of developing 1½ h.p., which operated a vertical flywheel by means of a beam. From a pulley, rigid with the flywheel, the transmission was by means of a belt to a wheel on a live-rear-axle. The seat of the vehicle was formed by a wooden chair mounted on the wooden frame, suggestive in its general outlines of the ancient Coronation Chair at Westminster. The steering consisted of a vertical pillar operated by a hand-controlled worm.

M. Santos Dumont has been explaining to a representative of the *New York Herald* a model of his airship, No. 11, which he is having built for the St. Louis Exhibition. It differs a good deal from his previous models. The gas vessel is longer in proportion to its width and more pointed than in the case of his previous airships, and in this respect resembles the proportions of the big Deutsch machine designed by M. Tatin and illustrated in the Journal for April 25th, 1903. Like No. 10 it has a propeller both in front and at the rear of the hull proper. But the main difference is to be found in the arrangement of the motor, which is carried in a secondary smaller hull slung some seven yards below the main hull and driving the horizontal propeller shafts of the two propellers by means of a vertical shaft with bevel gearing. The gas vessel has four internal compartments designed to prevent rapid movements of the gas inside it, and two separate ballonettes are arranged inside the two middle gas compartments, and are provided with air from a fan driven from one of the propeller-shafts. The arrangement of slinging the motor in a separate hull so far below the gas vessel renders all chance of igniting escaped gas by the exhaust improbable. The length of the gas vessel is 50 metres, with a maximum diameter of 7 metres; the propellers are 4 metres in diameter, and the rudder has a surface of 15 square metres. The girder carrying the engine can be slightly displaced forwards or backwards by means of controlling cables, and the whole airship tipped accordingly, by which means ascending or descending is effected.

Messrs. Shippey Brothers, Limited, of King Street, Cheapside, advise us that they have been appointed sole London agents for the Hercules Motor Wagon Company, of Levenshulme, Manchester. They propose shortly to have samples of these vehicles on permanent exhibition in London. The latest 1904 type of this vehicle could not be finished in time for tho Exhibition at the Crystal Palace, and will therefore be on view in the Minor Hall at the Agricultural Hall next month.

LAW REPORTS.

Continental Automobile Syndicate, Limited.—In the Chancery Division, on Saturday, Mr. Justice Byrne had before him the action of Commercial Enterprises, Limited, *v.* the Continental Automobile Syndicate, Limited, which came on as a short cause on motion for judgment. Mr. Maugham, for the plaintiffs, said the defendants had entered an appearance, but had not put in a defence. Plaintiffs were debenture holders, the company having issued a debenture to them. The principal became due on the 29th April, 1903, but had not been paid, and a receiver was appointed on the 27th November last. Mr. Justice Byrne gave judgment for the plaintiffs, made a declaration that the debenture constituted a charge on the undertaking, and directed the usual accounts and inquiries to be taken.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Gaso-Hydraulic Marine Engine Company, Limited, 16, College Green, Dublin (Irish Company).—Capital, £1,500 in 150 shares of £10 each. Object, to purchase from Messrs. Fingall, Cecil Orr, and Mark Louis Orr a patent for propelling vessels by explosion of gas or explosive vapour. Directors, Messrs. William C. Kirwan; William Perring, and Lionel Fitzgerald Orr.

Keene's Automobile Works, Limited, 2, Bath Road, Turnham Green, W.—Capital, £10,000 in £1 shares. Object, to acquire the business of Keene's Automobile Works. First directors, H. L. A. Perry Keene, C. F. H. Harrison-Watson, J. Urlwin, and C. Young.

Kennedy Motor Company, Limited, Newlands Road, Cathcart, Glasgow.—Capital, £10,000 in £10 shares. (Scotch Company).

Kelecom Motors, Limited.—Capital, £10,000 in £1 shares. Object, to acquire the business of a manufacturer of and dealer in cycles, cycle accessories, motors, motor cars, &c., now carried on by E. J. Willis at 79, Wells Street, Oxford Street, W., as the Ormond Motor and Cycle Company. First directors, R. Willis and A. Goodwin, M.C.E.I.

Ladies' Automobile Club of Great Britain and Ireland, Limited, Hans Crescent Hotel, Hans Crescent, Sloane Street, S.W.—Capital, £100 in £1 shares.

London United Motor Company, Limited.—Capital, £1,000 in £1 shares.

Lion Motor and Cycle Company, Limited, 189, London Road, South Lowestoft, Suffolk.—Capital, £2,000 in £1 shares. Object, to acquire the business carried on by Mrs. Ann M. Pinnell at 189, London Road, South Lowestoft, as the Lion Cycle Company, with certain patents relating to an improved motor and cycle brake. First directors, T. Pinnell (managing director) and Mrs. A. M. Pinnell.

Medway Motor and Engineering Company, Limited, 77, High Street, Chatham.—Capital, £2,000 in £1 shares. Object, to acquire the business of motor and cycle manufacturers and general engineers carried on by A. Wilson and E. T. Middlemiss at 56, High Street, Chatham, as the Chatham Machine Company.

Western Counties Manufacturing Company, Limited.—Capital, £10,000 in £1 shares. Object, to acquire the business of cycle accessory manufacturers, &c., carried on by J. R. Wilson, W. J. Pook, and E. Stevens, at Sawry Street, Plymouth, as the Western Counties Manufacturing Company, and to carry on the business of cycle and motor manufacturers, &c. First directors, W. J. Pook (chairman), E. E. Piper, and E. Stevens.

A dividend of ten per cent. for the past year has been declared by the Begbie Manufacturing Company, Limited, and the prospects for the present year are announced by the chairman to be very promising.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published February 25th, 1904.

2,141. A. Nicholson. Means for preventing slipping.
2,539. A. Nicholson. Non-slipping devices.
2,996. J. B. Dunlop. Silencers.
3,244. A. Eckstein and H. J. Coates. Electrical ignition apparatus.
4,555. L. Stroud and J. G. Gittos. Carburettors.
5 012. T. W. S. Hutchins. Variable speed-gear.
6,131. L. Mellor. Means for cooling the cylinders.
6,374. E. Espinasse. Carburettor.
6,770. C. Challiner. Wheels.
7,049. C. and G. Nouard. Lady's head covering and mask.
7,857. E. Bergmann. Brakes
12,268. J B. Catteau. Explosion motors.
14,090. A. Winton. Motor vehicles
25,519. Frankfurter Gasgluhlichtfabrik Gebruder Michel. Carburettors.
28,589 C. V. Childs. Internal combustion engines.
28,756. C. Pickering. Handl bears for motor cycles.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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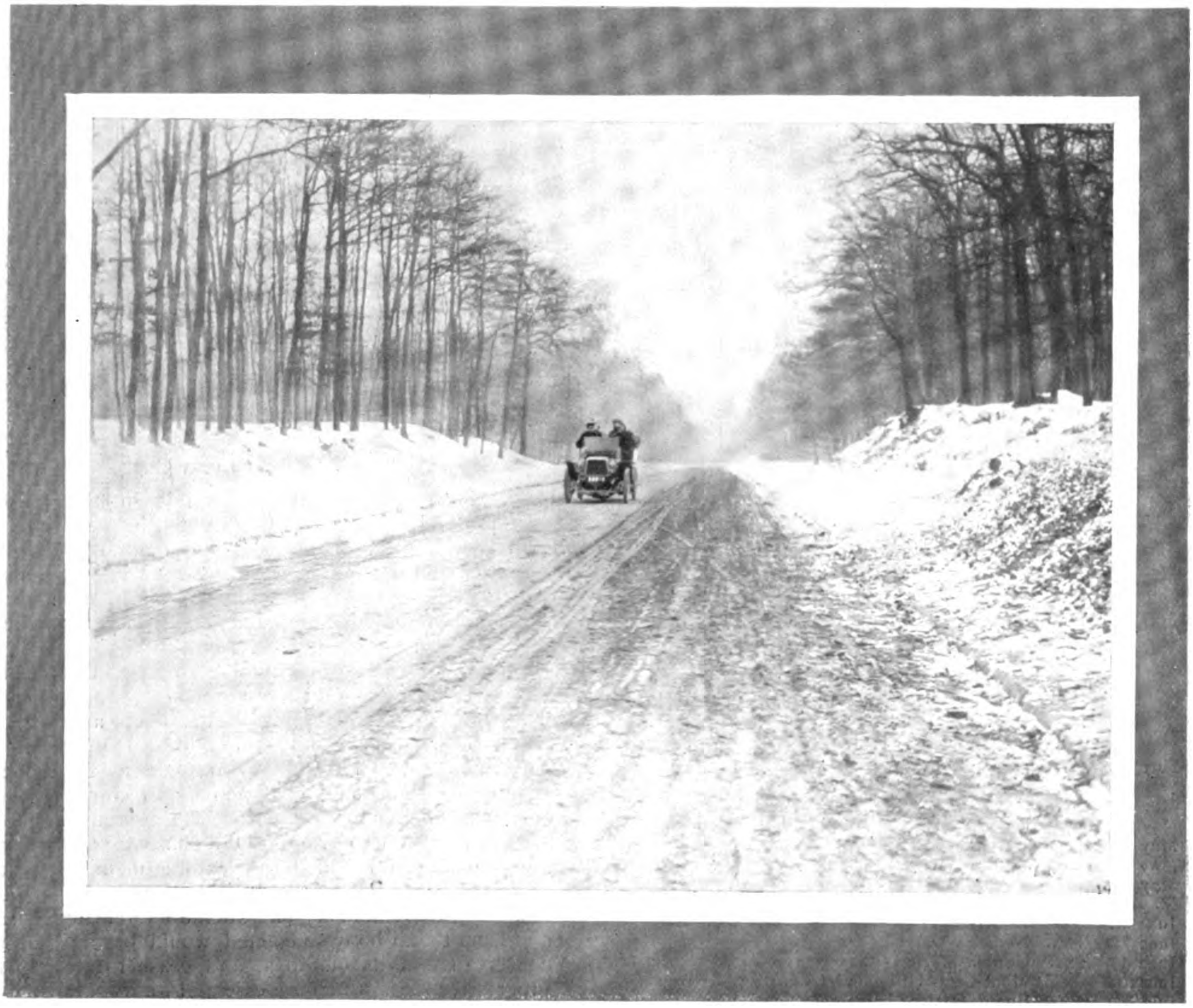

THE FRENCH CONSUMPTION AND RELIABILITY TRIAL.—A scene on the Picardie Hill on the first day's run last week. The car coming up the snow-covered road is the Vinot et Deguingand, one of the competitors. Particulars of the Trials appear in our current issue.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Mar. 15 ...	"Cost, Up-keep, and Care of an Autocar," by Messrs. J. Adam and J. H. Steen (Scottish A.C.).
*Mar. 17 ...	"The Use of the Highway," by Mr. Moresby White, B.L.
Mar. 19-26 ...	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24 ...	Alcohol as a Motive Power, by Dr. W. R. Ormandy.
Mar. 25-30 ...	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May ...	British Gordon-Bennett Race Eliminating Trials.
May 19-20 ...	Glasgow-London Non-Stop Run.
June 1-7 ...	Motor Bicycle Endurance Trial.
June 11 ...	Automobile Races, Ranelagh Club.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
Oct.-Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Mar.	Paris-Rome (*La France Automobile*).
Mar. 13-20 ...	Cannes Automobile Week.
Mar. 14-19 ...	Boston Show.
Mar. 19-27 ...	Frankfort Exhibition.
Mar. 20-29 ...	Nice Week (details, Oct. 31, p. 1168).
Mar. 21-26 ...	Washington (U.S.A.) Auto Show.
Apl. 4-9 ...	A.C. America Commercial Vehicle Trials.
Apl. 5-15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16-May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18-23 ...	Paris-Nice-Rome.
Apl. 30-May 12	Antwerp Salon.
May. 1 ...	Carburettor Trials (A. C. de France).
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8-12 .	A.C. Bordelais Automobile Week.
May 11-15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12-15 ...	Tours Tourist Trial.
May 14-15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16-23 ...	Circuit National Belge.
May 23-31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16-17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 18-23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23 25 ...	Lucerne Motor Boat Races.
July 23-Aug. 5	Spa Automobile Fêtes.
Aug. 5-11 .	Paris-Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup
Aug. 13 14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 22-Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14-22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

"Truth" on the Present Crisis.

How widespread is the interest felt in the present position and future prospects of the Automobile Club is well illustrated by the fact that a paper like *Truth* should have last week devoted a considerable portion of its space to the subject, and particularly to the criticism of Lord Shrewsbury's proposals to preclude members with a trade interest from sitting on the committee. *Truth* very properly points out that the position of the motor car industry renders the adoption of any such proposal highly inexpedient, and that it would be far from a good thing for the movement if the Automobile Club were to become a mere social institution, and confine its activity to controlling the movement merely in its aspects as a pastime, or from the sporting point of view. Our contemporary regards the principles on which the leading members of the Jockey Club are elected as not suited for the leading body of a progressive industry like the automobile movement, and fears that a body so elected would become far too conservative in its methods, and cease to possess the progressive ideas which are essential for assisting or even keeping abreast of a mechanical industry. This, of course, would be the result of carrying the principle to extremes, but the Automobile Club might very well, we think, be approximated to the Jockey Club in exercising a controlling power over what is proper and right in automobilism as a sport without in any way suffering from the kind of atrophy which *Truth* seems to fear would follow, and which, perhaps, it is rather unjust to attribute to the Jockey Club, one of whose leading members, at any rate, is so progressive a politician as Lord Stanley.

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Training Schools for Chauffeurs.

MR. CHAS. JARROTT, than whom no one does more, by example, precept, and practice, to promote every department of automobilism, has been wisely emphasising in an article in the *Daily Chronicle* the extreme demand there is at present for competent drivers, and the great difficulties in the way of the best class of man who wishes to learn the rudiments of his business. Mr. Jarrott admits that one of our Polytechnics has made a departure in this direction, but he rightly appears to regard the existing facilities for training as wofully inadequate. There we agree with him, and we agree with him again when he points out that one of the difficulties inherent in the situation is due to the obstacles in the way of obtaining suitable cars for training the candidates. Mr. Jarrott thinks a few wealthy enthusiasts might be willing to supply them "with the idea of benefiting two classes of the community—those who want to be 'chauffeurs,' and those who want 'chauffeurs.'" Here, too, we think, would be a good opportunity for car manufacturers. If all leading manufacturers would supply training institutions with one of their workshop cars, the result would be to enormously increase in a short time the supply of competent drivers, and what would, perhaps, be of no small value from the manufacturers' point of view, is that the drivers would naturally retain a predilection for the type of car on which they had learned to drive. *On revient toujours à ses premiers amours.*

Mr. Jarrott is highly amusing anent the experiences of various car owners with unsatisfactory chauffeurs. Where he gets these many delightful stories is a mystery to his friends, though they all know him to be possessed of inventive genius of a high order. Should Mr. Jarrott ever design to supplement his present business by running a humorous automobile journal, no one can entertain the slightest doubt that it would be an amazing success, for most of his good stories would be sufficient to set up an ordinary *raconteur* for a quarter. Among these we may mention the tragic episode of the insubordinate driver who took out all the servants for a run during his master's absence (not we fear an isolated occurrence) and upset the lot of them, killing the cook. The owner was a philosopher, and apparently a follower of Epicurus, as he was heard to observe that he could get a new car and a new chauffeur (the latter he probably did with despatch), but where, oh! where, would he ever again obtain such a cook!

Likewise will most people smile over the tale of the ambitious driver who persuaded his employer that his car required taking completely to pieces, and accordingly reduced it to an elaborate assortment of its component parts upon the floor. Then he put on his coat and decamped. The handy man of the stables volunteered to put it all together again, and ultimately exhibited the car perfect as far as could be seen on cursory inspection But alas! he also exhibited a large basketful of nuts, gear wheels, push-rods and various parts, for which he could find no appropriate application.

A Transference of Property.

UNDER the new Act, the local authorities, that is to say in most cases the County Councils, are instructed to set up signposts within their areas at dangerous corners, cross-roads, and precipitous places. For many years this duty has gratuitously been assumed by the C.T.C., whose notice boards at the top of dangerous, or supposedly dangerous, hills are familiar to everybody. Recognising that there will be now no need for them to maintain these boards any longer, the Secretary of the C.T.C. has adopted the sensible course of writing to the clerks of the different councils in England, Wales, and Ireland, suggesting that they should take over the existing notice boards and employ them as the boards which they will be required to erect under the new Act. Speaking generally, the County Councils have accepted the offer. At any rate, most of them are taking over the posts and are going to affix to the top of them signs of the kind to be approved by the Local Government Board. In the case of those councils who have not agreed to relieve the C.T.C. of their signposts in this way, the Secretary has notified them that his club, in view of the duty imposed upon the local authorities to in future safeguard the interests of all road users in this way, do not regard it as a duty to maintain them any longer, but will remove them unless the councils agree to their terms. At the same time the Secretary states that all recommendations sent in by coroners' juries to the C.T.C. will be forwarded to the respective county surveyors. There is a subtle touch about this allusion to coroners' juries which we think ought to remove any hesitation which the recalcitrant County Councils may entertain to taking over the signposts. Their position would be at least an unpleasant one if they allowed the existing danger boards to be removed and coroners' inquests, as the result of their not having put up new ones in time, should have to be held.

The C.T.C. are thus retiring from the performance of their self-imposed and philanthropic duty as the new Act has rendered it superfluous. But the thanks of the whole community ought to be accorded to them for the very efficient manner in which they have for so many years carried out what really ought all along to have been the duty of the local authorities. Many are the accidents to cyclists and, at any rate in their earlier days, to automobilists which these notice boards have prevented. Nor can horse owners say that they have found them superfluous. The C.T.C. have in this respect carried out admirable work of the greatest public utility, and though it is no longer necessary they deserve a hearty vote of thanks.

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Unappreciated Ingenuity.

OUR world is capricious in the manner in which it rewards ingenuity. With some of our great inventors the exercise of this talent has amassed colossal fortunes, though there are but too many inventors whose ingenuity keeps them in indigence, while that of others has even landed them in the workhouse. The ingenuity of Mr. Watts, an automobilist, who was brought before the Sussex magistrates at Heathfield last Saturday, resulted in his being fined £1 9*s.* 6*d.* One is obliged to admit a guilty feeling of sympathy, for Mr. Watts is highly ingenious, and by any persons but a bench of magistrates hostilely disposed to the automobile movement his ingenuity would probably have received amused recognition.

Whenever a new Act of Parliament was passed by the English Legislature, O'Connell used generally to sit down and puzzle out where he could drive the proverbial coach and four through it. Mr. Watts seems to have arrived at the conclusion that he had discovered an hiatus or omission of this sort in the Act of 1903. Nowhere, it appears, is it prescribed that the numbers with which motor vehicles must be embellished according to that statute should be Arabic numbers, so by way of a pleasing variation, and we cannot help fearing, with a view of bemuddling the police, Mr. Watts adopted Roman numerals, and adorned his car with the following legend: "A P CCXXXIII." When Police-Constable X. of the Sussex Constabulary, perceived this weird inscription approaching him at a reasonable rate of speed on the forefront of a motor car, he scratched his head first on one side and then on the other, blew his whistle, and then decided to call upon the apparition to halt. No argument or persuasion could convince him that that was a proper number, and he subsequently issued a summons, with the result that an unimaginative and unresponsive bench taking the same prosaic view fined Mr. Watts the sum alluded to above. All the same, we are unconvinced that Mr. Watts is technically incorrect. At any rate he pleaded that the numbers of Acts of Parliament are usually indicated in Roman characters, and what was good enough for an august Statute of the Realm ought to be sufficient for an humble motor car. The country policeman whose lot appoints him to the duty of manning motor car traps, will, at any rate, be thankful that the justices have attempted to stop the growth of this original method of numbering, for their perplexities in attempting to take the number of a rapidly retreating car embellished with Roman numerals, especially when the numbers run into thousands, would be terrific. There was an ancient legend of a Roman mathematician who became insane by attempting to do long division with Roman numerals. Let those who doubt the truth of the story attempt the process.

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A Rise in the Rate of Speed.

BUT the police also are capable of ingenuity, and Sergeant Jarrett having found that his former tactics of alleging a specific speed have on several occasions miscarried owing to defective stop-watches, searching cross-examinations, sceptical magistrates, honest assisting police constables, and other causes, has adopted a change in his methods. Under the old Act all the cars that passed Sergeant Jarrett on the Ripley Road proceeded, according to that functionary, at from 18 to 20 miles an hour, irrespective of their size or power and whether they were provided with one small cylinder or four large ones. By a curious coincidence since the speed limit has been raised to 20 miles an hour all cars cover the same portion of the Ripley Road at an increased speed of exactly 24 or 25 miles an hour, likewise irrespective of their make or power. Now Sergeant Jarrett has made a change, as we anticipated he would do, and is summoning motorists, not for travelling at a particular speed, but, as in the case of Mr. Rodakowski, of driving recklessly and so as to endanger the public. At the same time some of the Surrey magistrates having been heard to state that they thought the margin of five miles an hour (owing to the clumsy methods of timing adopted), was not sufficient for them to convict upon, Sergeant Jarrett has also raised his rate of speed, and now incidentally accuses those who fall into his trap of going at precisely 30 miles an hour. This at least was what he alleged in the case of Mr. Claude Brown, whose case came before the Woking magistrates last Saturday. As in the case of Mr. Rodakowski, there was the pathetic accompaniment of children who were being endangered by the furious driving on their way from Sunday School, though honest Policeman Pink, who again gave the trap away, said that the children were nowhere near the car. We conclude that with the change of tactics there will be a demand for children coming from Sunday School along the Ripley road, and any who may desire to assist in a police trap should, without delay, communicate with Sergeant Jarrett, and arrange to be returning from Sunday School along the Ripley road at frequent intervals, preference, of course, being given to the measured stretch of 176 yards which has already figured in a number of cases.

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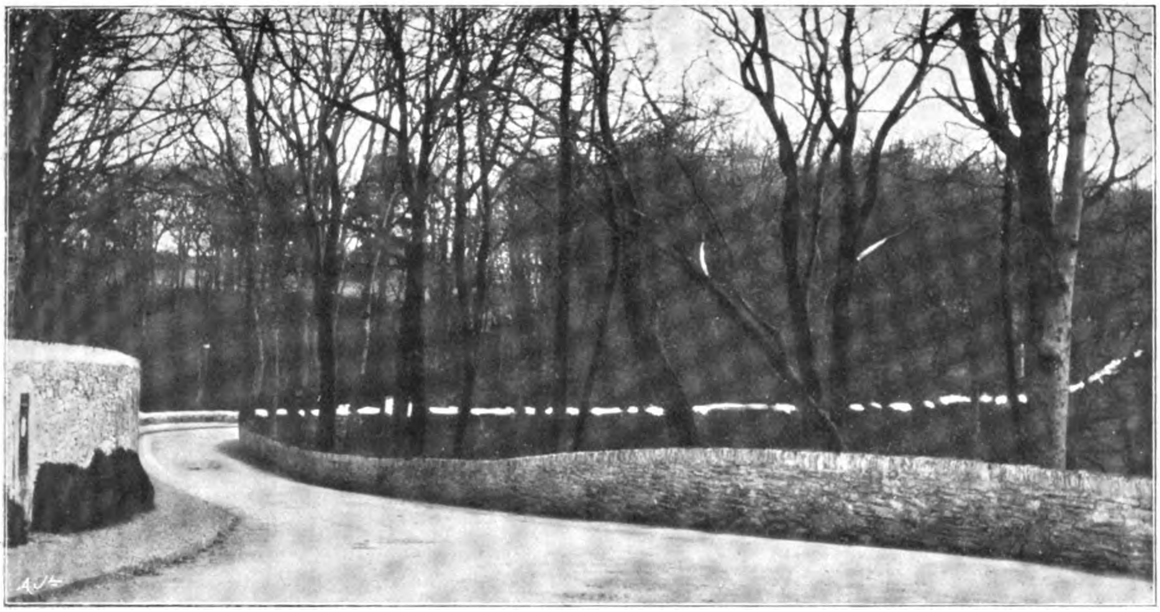
Coiners Caught by Car.

NOR must a meed of credit be withheld from Police Constable 473 T, of the Metropolitan Force, for readiness of resource in an emergency almost approaching to inventive genius. A couple of the gentlemen who gain a precarious, but probably exciting, livelihood by palming off counterfeit half-crowns and florins at suburban post offices and on the guileless and unsuspecting publican, were plying their nefarious calling in the suburb of Chiswick. They were equipped with a horse and trap. One of them was taken, but the other, jumping into the trap, attempted to escape at what was, for a hippomobile, a furious rate of speed. A motor car, however, was passing, and Policeman 473 T called upon it in the name of the law to assist him in his pursuit of the counterfeiter, with the result that the horse and trap were speedily run down, and the counterfeit-coiner enabled to enjoy the grateful hospitality of a police cell. When Police Constable 473 T next observes a motor car approaching at a possibly high rate of speed, and should there be in his mind any doubt as to whether it is exceeding the legal limit or being driven to the public danger, we trust he will remember the service rendered to him in apprehending a criminal, and accord the driver the benefit of such doubt. Ultimately we fear coiners will adopt the motor vehicle when attempting to distribute their nefarious wares, though probably the business is not sufficiently remunerative to enable them to do so just at present, and then we may see a new edition of the great scene in Lord Lytton's "Night and Morning"—coiners attempting to escape on one motor vehicle, pursued by police-constables on another. Would the pursuing police-constables in this case be amenable for a breach of the Act? Perhaps the legal adviser of the Motor Union could tell us.

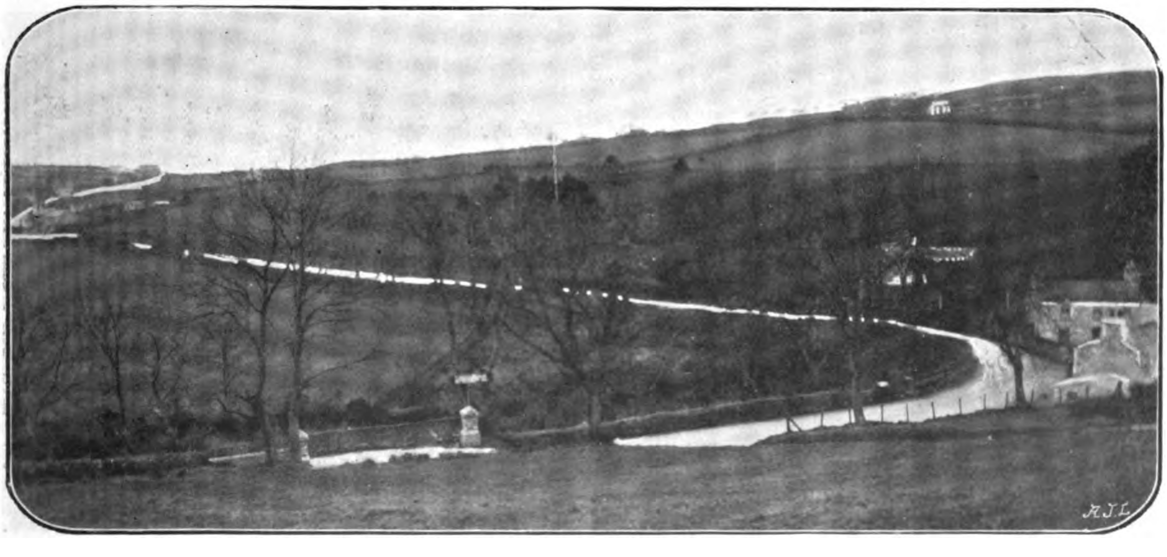
SOME time ago we announced that the Tunbridge Wells Town Council had determined to institute classes at their Technical Institute for giving practical information in regard to automobiles. These classes have now been started, and last week Councillor Abbott stated that the interest in these motor car classes had been a revelation to the Committee, an enormous number of applications to join, from all sorts of people, having been received. It had therefore been found necessary to add another class, and Mr. Abbott further announced that amongst the first students was the Mayor of the Town, Mr. Alderman Robb.

THE GORDON-BENNETT RACE, 1904.

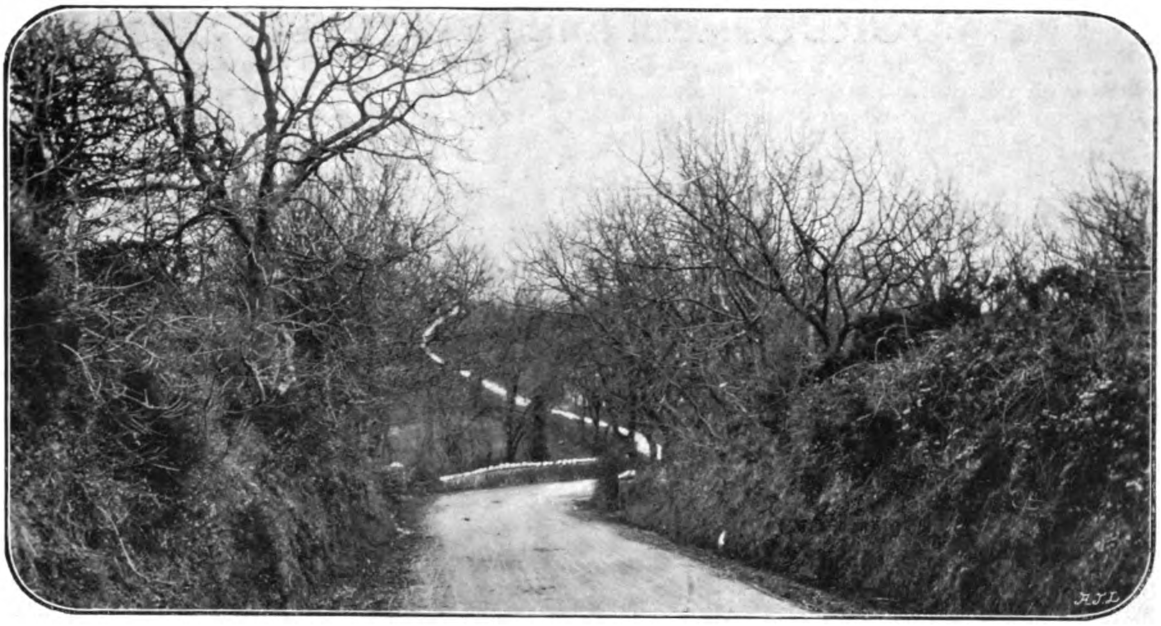


GORDON-BENNETT BRITISH ELIMINATING TRIALS.—The Governor Bridge, a scene on the Isle of Man Course, about 1½ miles from Douglas. The first awkward bit.

THE outlook for holding the British Eliminating Trials in the Isle of Man is distinctly promising. If the enthusiastic feeling prevailing in this delightful portion of His Majesty's domains is any criterion of the Government's inclinations, the Lieutenant-Governor of the Island will undoubtedly accord his permission to the races, which would probably take place during May. The 50 miles circular road which has been mapped out as suitable for the trials should give an opportunity for a splendid test of the cars which seek to represent Great Britain for this classic event. Although the course has not been chosen from the speed point of view, it will be a severe test of the skill of the drivers and the reliability of the cars entered. At many places the twists and turns and ups and downs are very severe, and only in one or two places are there anything like decent straight stretches of any great length. The surface of the roads, which are extremely well kept, is good, being chiefly of steam-rolled granite macadam, with an average width of about 18 feet. By way of compensating for the awkward corners and the steep gradients, the general character of the road selected consists of gentle curves and level well-formed highways. We are enabled this week to reproduce a few photographs taken on the course, which give a very excellent idea of the character of parts of the country through which the road lies. The main points which will be touched are Douglas, Laxey, Ramsey, Kirkmichael, Ballakinnag, St. Johns, and Ballasalla.



GORDON-BENNETT BRITISH ELIMINATING TRIALS.—The "Corkscrew" road at Baldrine, about 6 miles north of Douglas.



GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Silverburn Bridge, 10 miles from Douglas on the return road.

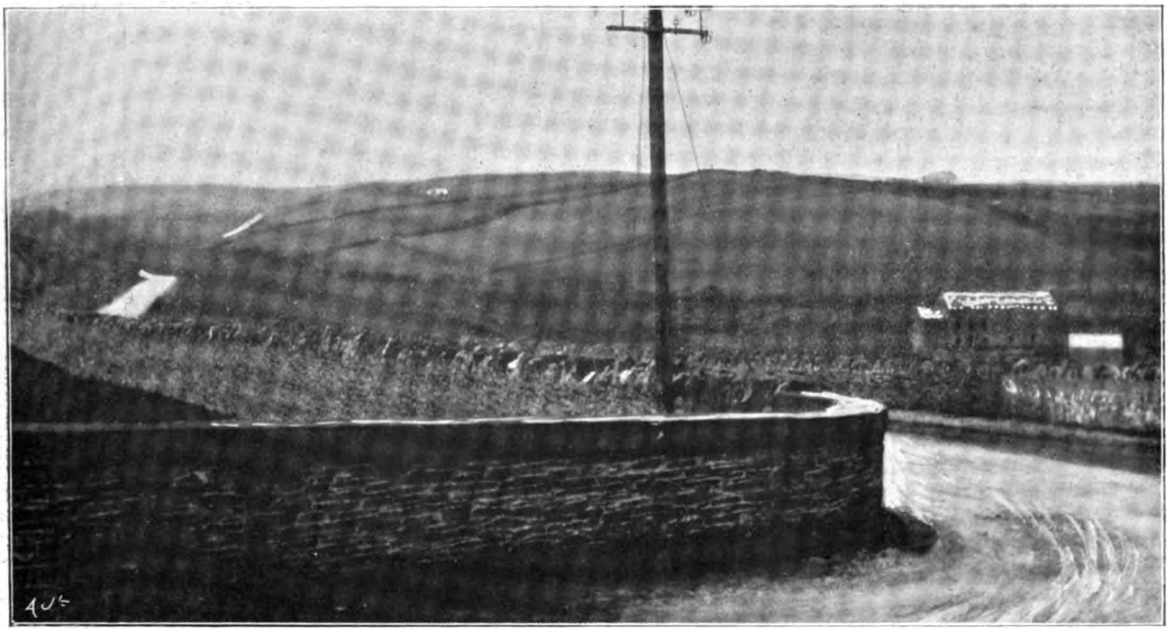
The Wolseley racing cars for the Eliminating Race are now well on towards completion. One will probably be finished this week, and the remainder in about ten days' time.

As we announced last week, the French Chamber of Deputies have officially consented to allow the French Eliminating Trials to take place on the Argonnes Circuit. The A.C. of France have now appointed May 20th for the date. The order of starting will be determined by means of ballot, but cars of the same make will not start one after another, but will be placed at regular intervals with the other cars, so that the firm drawing No. 1, having, say, entered three cars, would start in the order of No. 1, No. 11, and No. 21, respectively. The names of the drivers must be delivered to the A.C. of France by April 15th, and it has been wisely, we think, notified that ladies will not be permitted to drive any of the cars. The weighing and other formalities will take place on May 19th.

Austria has selected for its colours in the race black and yellow, Switzerland taking red and yellow.

The final course to be taken for the race itself in the Taunus has not yet been officially notified, although it is understood that some slight variations will be made from the original road selected. Elaborate preparations are being taken by the German Automobile Club, in

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—A sharp turn at Ballasalla.

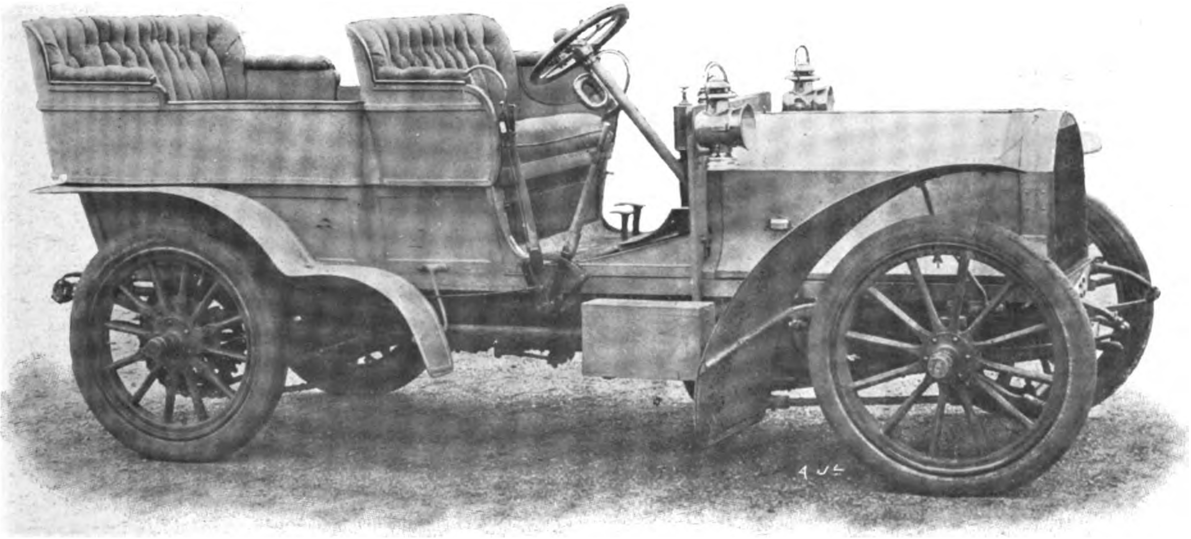


GORDON-BENNETT BRITISH ELIMINATING TRIALS.—On the homeward route. A double turn.

conjunction with the local and Imperial authorities, in regard to ensuring the safety of the public and getting over the dust nuisance which must necessarily arise. Near Homburg, in order to avoid a number of little villages, a new road is being laid out for the course.

THE 25-h.p. GOBRON-BRILLIE PETROL CAR (1904 TYPE).

THE general characteristics of the interesting petrol vehicles, sold in this country by the Gobron Motor Company, of 157, Knightsbridge, are already well-known to our readers, and were last brought before their notice in an illustrated article, dealing with the 12-h.p. model, in September last. The new 25-h.p. car differs in many respects from the 12-h.p., and is, as a matter of fact, designed to a great extent on the lines of the racing car, which did so well in many important events last year. The vehicle has a pressed steel to which the engine and the gear-box are directly attached, the engine has four cylinders, in each of which there are two pistons, the inlet-valves, as well as the exhaust valves, are mechanically-operated. An automatic float-



A 25-h.p. Gobron-Brillié Petrol Car

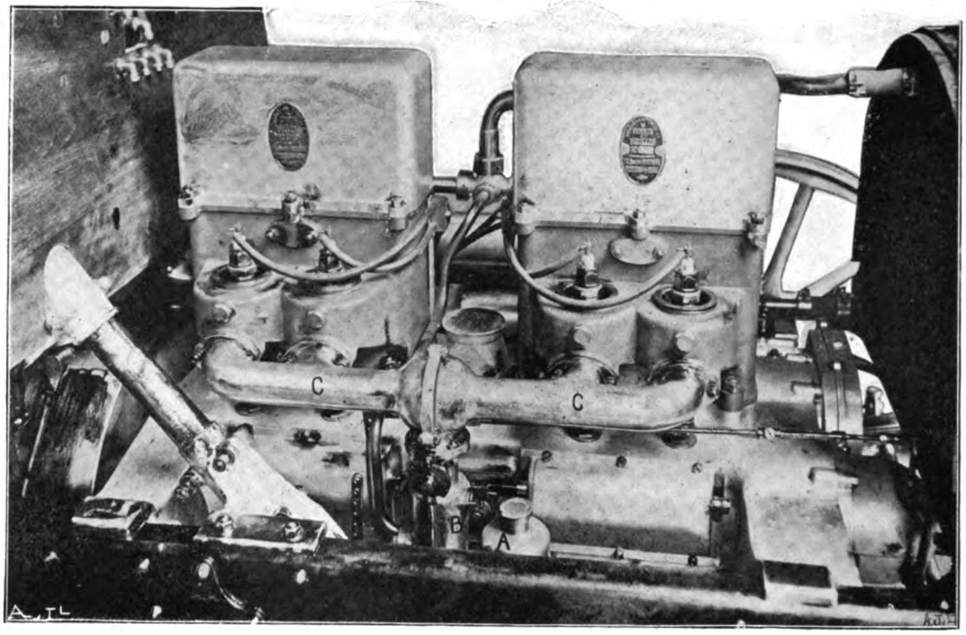


FIG. 1.—View of the 25-h.p., 4-Cylinder (8-piston), Gobron-Brillié Engine from the Right Side.

feed carburettor is substituted for the fuel distributor hitherto used, a peculiar form of double-cone-clutch has been introduced, and the construction of the gear-box has been modified to a great extent.

The engine is seen from the right and left-hand sides, respectively, in Figs. 1 and 2, where it will be noticed that the castings forming each pair of cylinders are of very much the same design as formerly, and that the upper pistons and connecting-rods are enclosed inside light aluminium cases (these covers have been removed in Fig. 2). The inlet-valves, however, are now arranged in the same position that the exhaust-valves formerly were, and the exhaust-valves are placed in separate valve-chambers on the opposite sides of the cylinders. The inlet and exhaust-valves are therefore operated by separate cam-shafts inside the crank-chamber. The lift of the inlet-valves can be varied by hand, the mechanism for this being enclosed in the crank-chamber and consisting of small pivoted levers introduced between the cams and the push-rods, so that they can be moved inwards and outwards, causing them to come into contact with the cams at an earlier or later period. This mechanism is controlled by one of the small hand-levers mounted above the steering-wheel. High-tension ignition-plugs are fitted into the inspection-covers above the inlets, and similar covers screw into the cast-

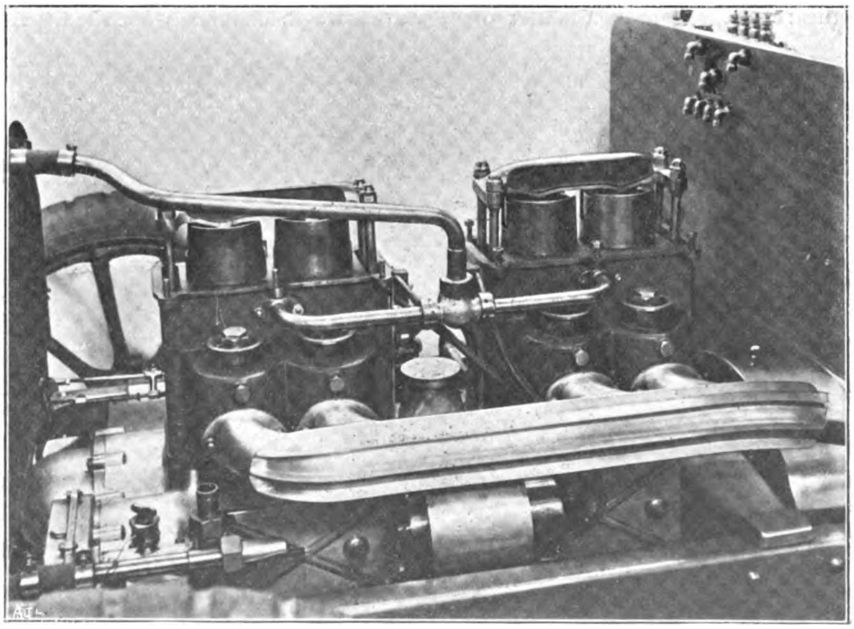


FIG. 2.—The New 25-h.p. Gobron-Brillié Engine from the Left Side.

ings above the exhaust-valves. A high-tension magneto is employed for generating and distributing the current to the ignition-plugs ; it is fixed to the left of the engine, and is driven by gearing from the exhaust cam-shaft. The gear-wheels driving the cam-shafts are entirely enclosed in front, and the governor also lies inside the same casing. The water is circulated from the honeycomb-radiator in front, by a gear-driven pump through the cylinder-jackets, and a branched circuit is arranged through a jacket surrounding the mixing-chamber of the carburettor. The air is drawn through the radiator by a fan formed in the flywheel, and the engine is, of course, entirely closed in on the underside by a sheathing, and above by a bonnet.

The engine, although nominally of 25-h.p., can, we understand, develop about 35-h.p. on the brake. It will be remembered that the upper pistons are given a shorter stroke than the lower ones, because the weight of their reciprocating parts is greater.

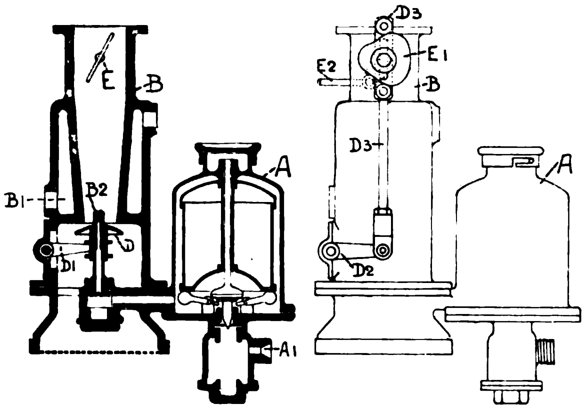


FIG. 3.—Cross Section and Elevation of the Gobron-Brillié Automatic Carburettor.

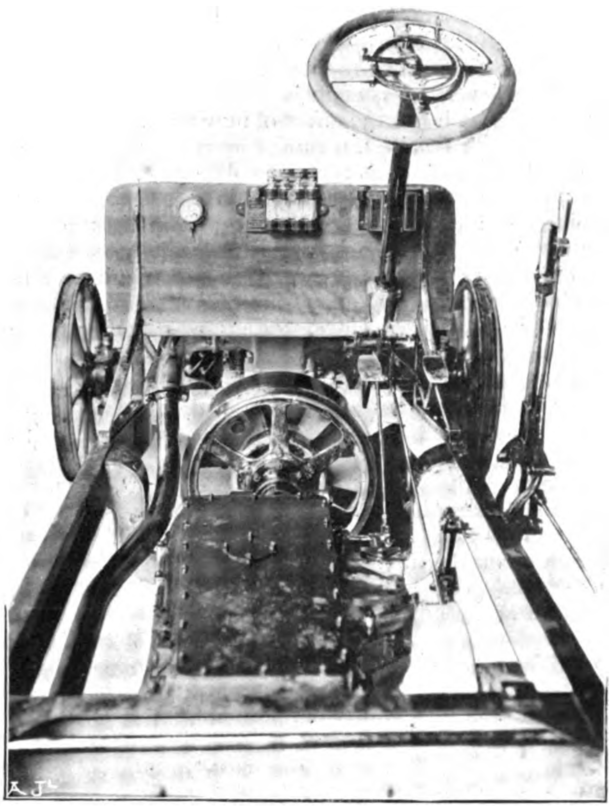


FIG. 4.—A View of the 25-h.p. Gobron-Brillié Chassis from the Rear.

The automatic carburettor is shown sectionally, and inside elevation in Fig. 3, whilst its position on the right side of the engine is seen in Fig. 1. The float-feed chamber, A, does not call for any special comment, but the water-jacketed mixing chamber, B, which contains the spray jet, B^2, at its lower end, is surrounded by a sleeve carrying a cone, D, in such a manner that the cone can be moved up and down outside it. This cone, D, can therefore be made to more or less obstruct the

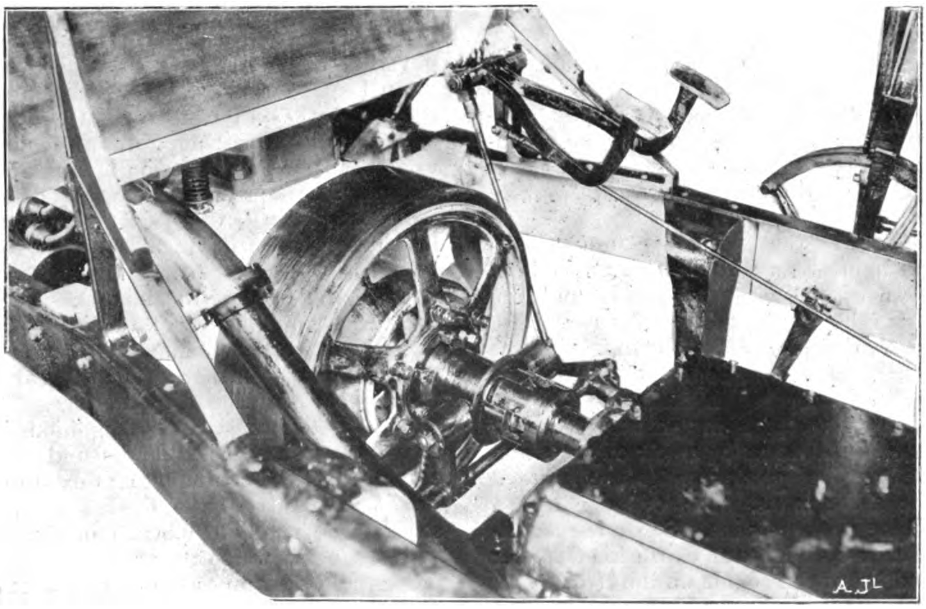


FIG. 5.—Central Portion of the 25-h.p. Gobron-Brillié Chassis, showing the Double-Cone Clutch.

passage of the main air entering at the bottom of the mixing chamber, B, past the jet, B^2. The cone, D, is engaged by a pivoted lever, D^1, inside the mixing chamber, which is fixed to the lever, D^2, outside the chamber, and this lever, D^2, is connected by the rod, D^3, with a cam, E^1, which has the effect of moving the rod, D^3, and therefore the cone, D, up and down when the cam is rotated about its axis; small rollers, D^3, ride on the periphery of the cam. The cam, E^1, is fixed to the spindle of a throttle-valve, E, arranged in the top of the mixing chamber, B, and it is this throttle-valve which is connected by the rod, E^2, with the automatic governor, and with a hand-lever above the steering wheel. By the arrangement of parts already described it will be noticed that as the throttle-valve, E, is gradually closed, so the cone, D, is gradually raised, with the result that the degree of vacuum in that portion of the mixing chamber between the jet, B^2, and the throttle-valve, E, is prevented from rising abnormally, and thus creating too rich a mixture. The shape of the cam, E^1, determines the relative positions of the throttle-valve, E, and of the cone, D, and therefore the maintenance of a constant richness of the mixture depends almost entirely upon its shape. The water-jacket, B^1, surrounds the central portion of the mixing chamber.

The engine is controlled by two small hand-levers mounted above the steering wheel, the one of which varies the time of ignition, and the other regulates the force exerted by a spring acting against the governor—thus determining the normal speed of the engine.

The main clutch is visible both in Fig. 4 and in Fig. 5, the former of these illustrations being a view of the chassis from behind and from above, and the latter being taken from the left-hand side to show the central portion of the car. The flywheel forms two external cone-clutch members, the one of considerably larger diameter than the other, and the forward end of the gear-shaft is fitted with two corresponding internal clutch members to engage with those in the flywheel. The two internal members have springs introduced between them, so that the smaller cone, which has a metal face, engages first, and the leather face of the larger cone comes into engagement when the clutch pedal is still further released. The metal cone, therefore, starts the car in motion and can slip, to a certain extent, without damaging the friction surfaces. The larger cone then engages when the car is actually in motion, it then preventing any slip from occurring.

A flexible coupling is introduced between the clutch and the gear-box, so as to render these parts self-aligning. The change-speed-gear provides four forward speeds and a reverse, all of which are operated by a single side-lever moving over a simple notched quadrant. A direct-through-drive to the countershaft is obtained on the top speed, and the lay-shaft is mounted to one side of it. Ball-bearings are used throughout and the power is transmitted to the rear wheels by side-chains. The gear-box is fixed rigidly to the main frame, and the countershaft has self-aligning bearings.

All three brakes are of the metal-to-metal internal type, and those fitted to the hubs of the rear wheels are completely enclosed.

The vehicle has a wheel base of about 8 ft. 10 ins., and the track is about 4 ft. 5 ins.

THE 14-16-H.P. RYDE PETROL CAR.

THIS vehicle was one of the new models shown for the first time at the Crystal Palace Exhibition, and is, we understand, of English construction throughout. It is of the live-axle type and has a 3-cylinder engine which is capable of giving about 16-b.h.p. at 900 revs. per min. The general appearance of the car is shown in Fig. 1 and a side view of the chassis in Fig. 2.

The pressed steel main-frame carries the engine and the change-speed-gear, both of which are fixed direct to it at four points. It is suspended on semi elliptic side-springs in the usual way, and the live-rear-axle is connected with it by radius rods at each side. All four wheels are of equal size and these are shod with 32-in. pneumatic tyres.

The three cylinders of the engine are formed by a single casting, which provides valve-chambers on both sides. All the valves are interchangeable, and are mounted vertically in the bottom of the valve-chambers, with inspection covers above each. The inlet-valves are on the left, the exhaust-valves on the right, and separate cam-shafts are mounted beneath them, inside the crank-chamber. The three inspection covers for each set of valves are held down by a pair of yokes and two nuts, and high-tension ignition plugs are screwed into the covers above the inlets. The cylinders have a bore of 4 ins., and the stroke is 5 ins. Separate exhaust-pipes are led from each cylinder to an expansion-chamber lying alongside and below the engine on the right.

The crank-chamber is made in three pieces in such a way that the base can be taken off without disturbing the crank-shaft, and that the pistons can then be removed if necessary. Separate bearings are fitted between each of the cranks, which are, of course, set at an angle of 120 degrees from one another; there are thus four bearings for the shaft. The gear-wheels driving the cam-shafts are entirely enclosed, as also is the governor, which is mounted on the front end of the inlet-cam-shaft. This governor is connected with a throttle-valve, and the normal speed of the engine can be varied by an accelerator-lever on the steering-pillar.

An automatic carburettor, in which a spring-loaded-valve regulates the admission of auxiliary air, is used, and its mixing chamber is water-jacketed. The water is circulated through this jacket and through the cylinder-jackets by a pump, which is driven by friction off the flywheel, the water being forced through a radiator forming the front of the bonnet. The radiator is built up with a large number of vertical "Loyal"-type tubes, which connect small aluminium reservoirs, above and beneath them, together. The vertical members are of the multi-tubular finned type.

A high-tension system of ignition is employed, for which the usual accumulators and trembler coils are employed. The commutator is fixed to the dash, and is driven by a chain from the rear end of the inlet cam-shaft. The revolving portion of the commutator consists of a brush which runs round inside the commutator proper, and distributes the current alternately to each of the coils. The spindle is free to move longitudinally in its bearings, although normally held in its working

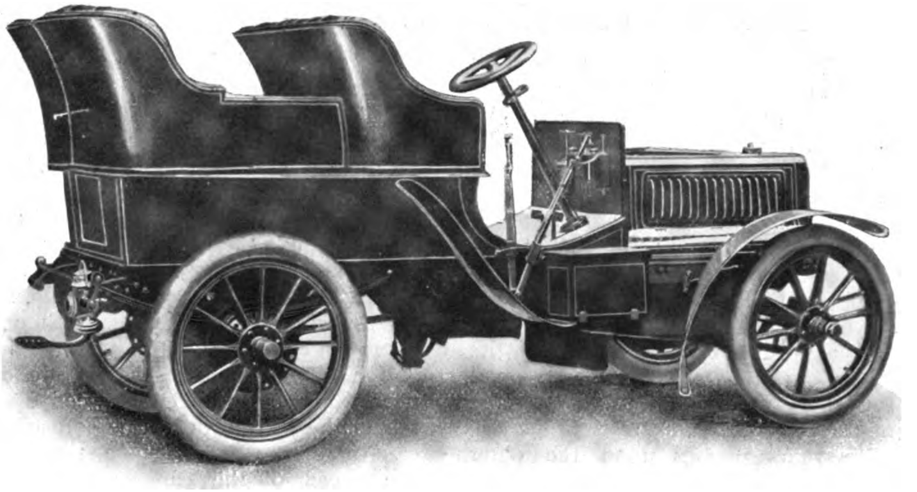


FIG. 1.—The Ryde 14-16-h.p. 3-Cylinder Petrol Car.

position by a spring. The commutator can be inspected or thoroughly cleaned by pressing the spindle carrying the brush rearwardly, so that the brush comes away clear of the stationary portion of the apparatus.

The transmission gear does not differ in any important respect from that usually found on other cars of this type. A leather-faced cone-clutch rides upon the front end of the gear-shaft, and is operated by a foot-pedal. The change-speed-gear gives three forward speeds and a reverse, with a direct-through-drive on the top speed, the lay-shaft revolving whenever the car is in motion. The various speeds are introduced by a single side-lever, and they represent about 7, 14, and 21 miles per hour, with the engine running at 750 revs. per min. The car is, therefore, able to travel at a maximum speed of about 33 m.p.h. It is not geared higher than this, so that the top gear may be used under all ordinary running conditions, and that very frequent changes from one gear to another shall be avoided. Plain bearings are used throughout except for taking end strains, when ball thrust bearings are introduced. The propeller shaft is universally jointed at both ends ; provision is made for lubricating the entire mechanism, and the live axle is strongly made.

All three brakes are of the metal-to-metal type, in which a pair of hinged shoes are mounted about the drums. The shoes are all interchangeable, the brakes are normally held quite clear of the drum by strong springs, and the foot-operated brake is fitted immediately behind the gear-box on the direct-through-shaft.

The Company (Ryde Motors, Limited, of West Ealing) are also introducing a 10-h.p. petrol van for commercial use, and this has a twin-cylinder engine fitted to a chassis of much the same general construction as the 14-h.p. model which we have just described.

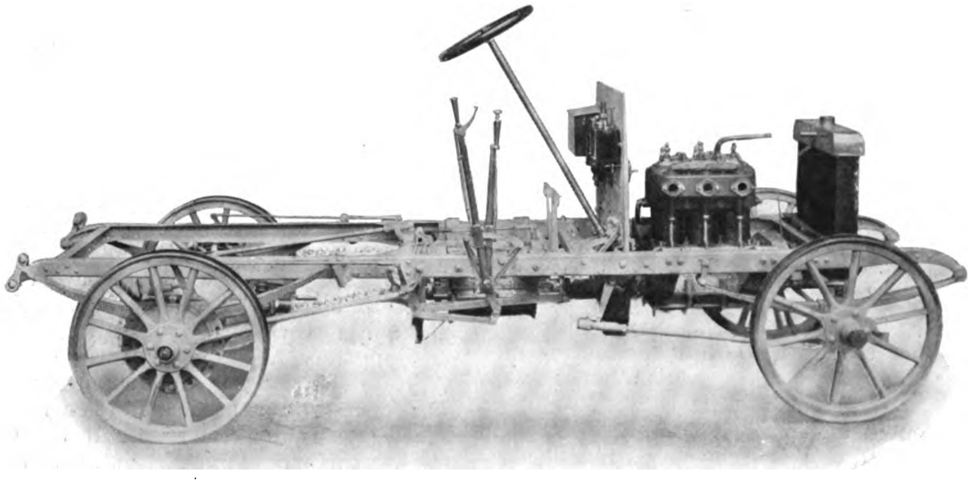


FIG. 2.—View of the 3-Cylinder Ryde Chassis from the Right Side.

THE type of car secured by the Chief Constable of Sussex, Major Laing, is one of the latest pattern Wolseley's.

APRIL 30TH to May 12th has been selected for the date of the Fourth Antwerp Automobile Salon.

A PECULIAR PETROL ENGINE—THE "DANIEL."

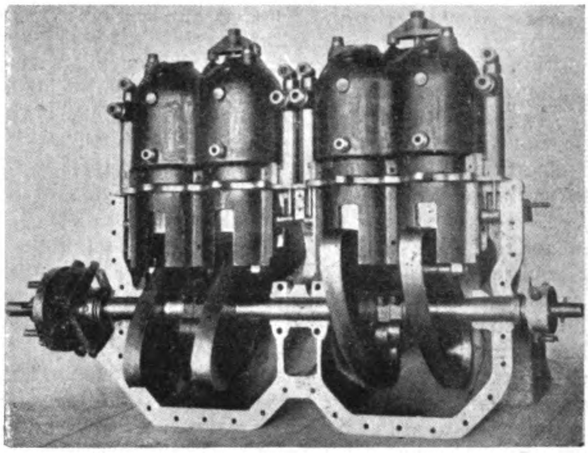
An engine in which elliptical cams replace the cranks on the main shaft, and in which no connecting rods are employed, has recently been brought out by the Société des Études Mécaniques, and was exhibited during the last few days of the Paris Salon. The construction of this engine is shown in our illustration, in which one side of the vertically divided crank-chamber has been removed, and it will be noticed that it has four cylinders, which are mounted vertically in pairs above the crank-chamber. These cylinders are fitted with the usual valves and igniters, and they work on the four-stroke cycle. The curious feature of the Daniel engine is that the pistons are fitted with small rollers instead of with connecting rods, and that the shaft beneath them has elliptical cams with which the rollers engage. One roller presses upon the outer surface of its cam, and the other runs beneath the projecting face of the cam, and lies inside it. The peculiarity of this arrangement is that each of the cylinders performs a complete cycle (the four usual operations) during every revolution of the main shaft, so that each piston gives an impulse to the shaft during each revolution, although the impulse extends over a quarter of a revolution only; in other words, each piston reciprocates downwards and upwards twice for each revolution of the shaft.

When a piston is being forced downward by the explosion, its roller which rests upon the outer surface of its elliptical cam forces the shaft round through a quarter of a turn by pressing upon it. During the next quarter turn, the cam pressing against the roller forces the piston upward, expelling the exhaust gases. For the suction stroke which follows, the cam would have to draw the piston downward by engaging with its other roller, which is inside the rim of the cam, and thus any lost motion between the two rollers and the rim of the cam would cause objectionable free play, but for the fact that the pistons are connected with small pumps lying alongside the cylinder as seen; these pumps form air cushions which tend to keep the upper rollers in contact with the cams during the suction stroke of the pistons. The suction stroke, of course, is complete during a quarter revolution of the shaft, and, during the remaining quarter turn of the shaft, the cam forces the piston upwards once more, compressing the charge in just the same way that the exhaust stroke was performed during the second quarter turn.

The cams for each pair of cylinders lie parallel with one another, and the two sets of cams are placed at right angles to one another. By this arrangement, therefore, it is possible to connect the pistons in each pair of cylinders together—although we are not clear as to whether this has actually been done—and thus cause the working stroke of the one piston to correspond with the suction stroke of the other, still further ensuring an absence of free play between the pistons and the cams, by rendering the lower and inner rollers inoperative under normal running conditions.

The net result gained by this arrangement is that, for the same piston speed, the engine-shaft revolves at half the speed that it does with an ordinary engine, and that an equivalent effect is, therefore, ensured to that of gearing down in the ratio of two to one, but without any gear wheels. It is difficult to foresee whether any actual increase in the output of such an engine would be obtained, because the power developed in ordinary petrol engines is limited largely by the weight of the reciprocating parts, and we do not know whether the reciprocating parts in the Daniel engine can be made lighter than usual. The direct claim, however, which is made for it is that there are no connecting-rod bearings to run hot or to require adjustment. The weak point in the engine, of course, is the tendency for play to occur between the cams and the two rollers on each piston, and this is the real reason why the pumps alongside the working cylinders are provided. These pumps are also utilised for forcing air into a pressure drum, so that the engine can be started at any time, without manual effort, by using the energy thus stored up for the purpose.

The inlet and exhaust-valves are operated by eccentrics, which are mounted between each pair of cams on the main shaft, for it will be noticed that no additional cam-shaft is needed, since the main shaft runs at the speed of the cam-shafts on an ordinary petrol engine. In the illustration it will be seen that the commutator is mounted on the forward end of the shaft outside the crank-chamber, and that a centrifugal governor is mounted close up to the flange to which the flywheel is bolted at the other end. Strictly speaking, a flywheel of twice the usual size is, of course, needed.



This particular engine is of 80-h.p., and its range of speed is said to be from 80 to 1,000 revs. per min. It can be built with two cylinders instead of four, and for any power between about 8 and 100-h.p. At present it is intended to manufacture twin-cylinder 12-h.p. and 4-cylinder 16 and 20-h.p. models. The existing engine is to be fitted to a special chassis, which will, it is hoped, take part in some of the principal races this year. The car will only have two speeds and a reverse, the forward speeds giving about 42 and 84 miles an hour, respectively. The car will, according to our contemporary, *L'Automobile*, have a wheel-base of 14 ft. 9 in., and the track will be 4 ft. 9 in. An armoured wood frame will be used, and the engine and the change-speed-gear fixed direct to it. It will be interesting to see how this type of engine behaves in practice.

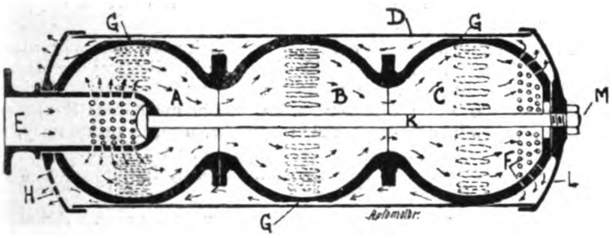
Commencing with this month the first Clarkson steam motor 'bus which the Eastbourne Corporation have purchased was put into regular service. The smoothness of the running and the rapid travelling has been a source of the greatest satisfaction, both to the members of the Corporation and the public. This vehicle is capable of accommodating fifteen passengers on each journey.

THE "UNIVERSAL" SILENCER.

A VERY successful attempt to devise a noiseless silencer has been made by Mr. N. Sharpe, and has been put on the market by the Imre Engineering Company.

Our drawing represents a longitudinal section through the silencer, which consists of three hollow spheres of aluminium, A, B, C, enclosed in a copper tube, D, which supports them laterally. The exhaust gases enter at E, and emerge into the first globe through the perforated end of the exhaust pipe; they then pass through the three globes in succession and out into the copper tube through the perforations, F, provided in the last of the globes. The gases next pass back over the globes, through small fluted passages, G, cut on their surface, and finally emerge into the atmosphere through the perforated cap, H, at that end.

As will be seen, the construction is very simple; the globes which are an easy fit in the tubes are held close together by the central bolt, K, which also secures the caps, H and L, and holds the silencer in position on the exhaust pipe. All that is necessary in order to take the whole apparatus apart is to take off the nut, M, when the globes may be readily drawn out and the copper tube removed.



The design is very compact, and is so arranged that the area in the necks joining the globes, and in the fluted passages surrounding them, is equal to one and a quarter times the area of the exhaust-pipe. Therefore, no throttling takes place, and the gases are allowed to expand and cool by successive stages.

We have recently had an opportunity of seeing an experiment with this silencer, in which it was mounted on a 12-h.p. car alongside an ordinary silencer of the same size. The exhaust was turned into each alternatively, and the result clearly demonstrated the superiority of the "Universal" silencer over the other in its capacity for reducing the noise of the exhaust gases.

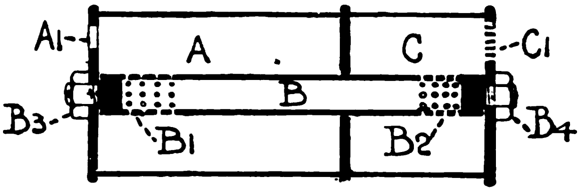
The dimensions of the silencer tested, which was constructed for use on cars of 8-12-h.p., are 21 in. long by 6 in. diameter. The Imre Engineering Company are making the "Universal" silencer in various sizes, the smallest, which contains only two aluminium globes, for use on a motor bicycle.

* * *

AT the meeting of the Hart Accumulator Company, Limited, last week, Mr. G. W. Kidd, the chairman of the Company presiding, it was announced that the manager of the Company had designed an accumulator plate which they were now putting on the market, which had proved a great success. They considered that this plate was of the very greatest value, and when put into more general use would prove better than anything that they had hitherto had. The Company, who have felt their way carefully, have now taken up automobile work to a very considerable extent.

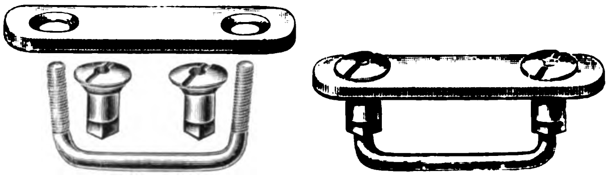
THE "ABINGDON" SILENCER AND THE "ABINGDON" BELT FASTENER.

ONE of our illustrations represents a longitudinal section through a new silencer, which has been put on the market by Messrs. Coxeter and Sons. It consists of two cylindrical compartments, A and C, with a tube, B, perforated at either end, communicating between them. The exhaust gases enter the chamber, A, by the hole, A^1, and then pass into the tube, B, through the perforations, B^1, emerging into the chamber, C, at the other end through the holes, B^2. From C the gases pass out into the atmosphere through a number of small holes, C^1, drilled in the cap on that end. The whole arrangement is held together by the nuts, B^3 and B^4, which screw on studs at each end of the tube, B.



The "Abingdon" Silencer.

The other illustrations show a new fastener for motor bicycle belts, put on the market by the same firm. As will be seen, it consists of a bent wire screwed at each end, which passes through the belt, and is secured in place by threaded nipples, the heads of which screw down against a flat plate. The nipples are made sufficiently long to pass well into the leather, and to reduce the cutting action of the wire. Although particularly adapted for V belts, it is, of course, suitable for joining up flat belts, one or more fasteners being used, according to the width of the belt.



The "Abingdon" Belt Fastener.

* * *

THAT interest in the motor boat is increasing on the other side of the Atlantic as much as in Europe is shown by the recent Sportsman's Exhibition in Madison Square Gardens, New York. As usual a huge tank was provided in the main building. In previous years this was the scene of displays of boating skill by a number of Indians in their canoes. This year the whole idea has been changed, and the tank is entirely occupied by a number of motor boats, which, as occasion requires, are driven round the tank for trial purposes. The motor launch entirely dominates the whole show this year, although other sports are represented as heretofore in the Exhibition, and the traditions of the past are upheld by the general style of the decorations remaining as before, the background in the main hall being built up as a woodland scene.

With the progress which is being made on this side of the Atlantic in motor boats, we should like to see something of the sort inaugurated in London for 1905.

VALVES AND VALVE MECHANISM OF INTERNAL COMBUSTION ENGINES.*

By Robert E. Phillips, M.I.Mech.E., A.M.I.C.E., &c.

IN order to keep the paper within reasonable limits, I propose to confine my remarks entirely to the valves and valve mechanisms employed in the internal combustion engines of the "Otto," or four-cycle type.

In the modern petrol engine it is the universal practice to open the exhaust valve positively and to close it by a spring. In early practice the induction valve was arranged to open atmospherically and to be closed by a spring, but at the present time the tendency of manufacturers is to operate these valves mechanically in a similar manner to the exhaust valves.

If the induction valves are mechanically operated they are generally placed in one of three positions: (1) side by side with the exhaust valves, operated by cams on the half-motion shaft; (2) on the opposite side of the cylinder to the exhaust valves, operated by cams on a second half-motion shaft; (3) immediately above the exhaust valves, in the same position as atmospheric valves are placed, operated by cams on the half-motion shaft carrying the cams for the exhaust valves, acting through rocking levers. Where the size of the cylinder is such that there is room to place the valves side by side without either decreasing the size of the valves or unduly increasing the length of the engine, this would appear to be the best arrangement, and failing this, the arrangement in which the induction valve is placed above the exhaust valve. There seems to be neither rhyme nor reason for locating the induction and exhaust valves on opposite sides of the cylinder.

In induction valves of the atmospheric type the spring is the important factor, as on its perfect adjustment depends the efficient action of the valve. It is apparent that the conditions necessary for perfect opening and closing are so opposite that the best that can be done is to strike a happy medium, which only produces a medium result.

The atmospheric induction valve has other, though less serious, defects. For instance, it is liable to "stick up" on its seating. It is subject to considerable wear and tear, especially on its washer and cottar, and the controlling spring is exceedingly liable to become impaired by use.

Many attempts have been made to improve the atmospheric induction valve. Mr. E. Estcourt employed two springs to each valve, a weak one operating to keep the valve up to its seating, and controlling its opening, and a stronger one acting as a buffer spring, and so avoiding excessive hammering of the valve, and to some extent assisting to close it more positively.

Mr. M. S. Napier, in order to obtain a maximum opening with a minimum of lift, designed the annular inlet valve associated with his name.

Another improvement is that of Messrs. Pidgeon and Bradley. In their construction the valve is nominally kept slightly off its seating by a supplemental spring which slightly overbalances the spring operating to press the valve towards its seating, the valve being retained in contact with its seating during the compression, working, and exhaust strokes of the piston by the pressure in the cylinder.

While all these valves have individual merit, not one of them can be said to remedy all the defects of the atmospheric induction valve, or even the most serious of them.

A comparison between the atmospheric and the mechanically-operated induction valve can, I think, be best made by comparing them with an ideal induction valve, which I take to be as follows:—(1) A positive and instantaneous opening immediately the pressure in the cylinder falls to that in the induction pipe, and a positive closing at the end of the suction stroke, at all speeds of the engine. (2) Inability of its action to become impaired or disarranged by use. (3) Automatic adjustment of the time of opening according to the speed of the engine. (4) Inability to "stick up" on its seating. (5) Absence of vibratory action, and consequently diminution in wear and tear and absence of noise.

Dealing first with the opening and closing:—As the atmospheric valve only opens after the piston has completed a part of its suction stroke, a full charge of gas is never drawn into the cylinder, and owing to the lightness of the spring, the valve does not return to its seating positively at the end of the suction stroke, with the result that a certain percentage of gas in the cylinder is discharged through the valve, involving a loss both in the quantity of the charge and in the compression, with a relative reduction of power. There is consequently a loss at each end of the suction stroke. Beyond which, any loss of compression in the cylinder increases the lag of the valve at opening. The time at which an atmospheric valve opens varies with the pressure of the exhaust gases remaining in the cylinder, which pressure varies with the speed of the engine. With a mechanically-operated valve, however, no such variation in the time of opening can take place, as the action is a positive one, and owing to the varying pressure of the exhaust gases remaining in the cylinder, the valve must be set to close, not at the dead centre, but some time later in order to avoid opening the valve before the pressure of the exhaust gases have fallen to atmospheric pressure, otherwise the gases will blow back into the induction pipe and reduce the volume of the incoming charge. Consequently, whether the valve is set to open at the dead centre or later, a full charge of mixture can never be drawn into the cylinder when the engine is running at a high speed. While the advantages under this head undoubtedly rest with the mechanically-operated valve, its action is by no means a perfect one.

Dealing next with the question of wear and tear. The spring of the atmospheric valve is its weak point, and, as the action depends entirely upon the spring, it follows that any variation in the tension of the spring at once impairs the efficient action of the valve. The cottars and washers through which the springs act on the valves are also subject to considerable wear, and not infrequently break, owing to the continuous hammering to which they are subjected. With a mechanically-operated valve this hammering action is very greatly reduced, and the only serious wear and tear arises in the parts of the operating mechanism. Any wear in the operating levers means so much lost motion, involving a lap at opening and a lead at closing. There is, therefore, not much to choose between the two types of valve under this head.

In the matter of adjustment. It is well known that with atmospheric valves there is considerable difficulty in adjusting the strength of the spring of the valve so as to obtain the greatest efficiency. Although the same difficulty arises with mechanically-operated valves, the adjustment is much simpler, and, consequently, the mechanical valve has a slight advantage under this head.

As regards "sticking up," this cannot possibly take place with a mechanically-operated valve.

Lastly, with respect to vibratory action and noise. All atmospheric valves produce a chattering noise, set up by the sucking action of the piston. This not only diminishes the amount of charge, but subjects the cottars and washers to a considerable amount of hammering, involving wear and tear. With mechanical valves this vibratory action is entirely absent, so that the advantage lies with this type of valve.

It is, therefore, clear that of the two types of valves the mechanically-operated one approaches most nearly to the theoretically perfect valve, but it is at the same time apparent that neither completely reaches the ideal standard, inasmuch as (1) with neither is a full and complete volume of charge drawn into the cylinder at all times; and (2) both require adjustment.

The construction of exhaust valves and the method of operating them leaves little to be desired, and any improvement will probably be in the direction of water cooling the valves, of varying the time of closing according to the speed of the engine, and of obtaining a quicker opening and closing. Several attempts have already been made to water-cool the exhaust valves, though it has not been successfully employed in petrol engines. Mr. O'Gorman has carried out some experiments with a view to obtaining a more rapid opening and closing of an exhaust valve. He employs a supplemental spring arranged to throw the valve wide open immediately the valve has been lifted from its seat by the action of the cam, the supplemental spring being energised by the idle movement of the valve lifter before it makes contact with the stem of the valve. The rapid closing of the valve is obtained by so mounting the cam on the shaft that it becomes loose at the end of the exhaust stroke.

As the results of some experiments with the induction valves of the engine of my Rochet-Schneider car, I have designed a valve which I believe will be found as much in advance of the mechanically-operated valve as that valve is in advance of the atmospheric valve.

The special feature of this valve, which I have termed the "auto mechanical," is that it is retained on its seating during the whole of the compression and working strokes and during part of the exhaust strokes of the piston by a spring, and during the latter part of the exhaust stroke of the piston by the pressure of the exhaust gases in the cylinder alone, so that it is free to open automatically—either by gravity or by the action of a spring—immediately the pressure within the cylinder drops to that in the induction pipe, with the result that it always opens at the correct time whatever the speed of the engine. The spring employed is strong enough to ensure the positive closing of the valve, and the pressure of the spring is removed from the valve so as to free it before the end of the exhaust stroke, and is restored to it to allow it to operate and close the valve at the end of the suction stroke of the piston by mechanical means, preferably by mechanism deriving its motion from a cam on the half-motion shaft of the engine. As the time at which the pressure of the spring can be removed from the valve is immaterial within certain limits, so long as it is in advance of the time the valve should open, the motion for operating the mechanism for removing the pressure of the spring from, and restoring it to, the valve can be taken from the cam actuating the exhaust valve, but of course this is not obligatory.

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*Excerpt from a paper read at the Automobile Club March 3rd.

This valve mechanism has had a pretty thorough and exhaustive trial, and I may remark that after the various new parts had been assembled on the engine by myself the engine started off at the first turn of the handle, and no alteration or adjustment has been made from that day to this. I call particular attention to this as emphasising the fact that this valve requires no adjustment either in the first instance, or subsequently, as it automatically adjusts itself to its work under all conditions. In fitting this valve to my engine I did it in such a manner as to permit of the re-instatement of the atmospheric valves in their original form at will, so that a comparison in the efficiency of the engine with these two valves in actual running could be made. After an exhaustive series of runs with each type of valve under as approximately as possible similar conditions, I have no doubt whatever in my own mind as to the increased power of the engines when fitted with this valve, and my views are endorsed by several men fully qualified to form an accurate opinion. Lack of opportunity has so far prevented my making any brake tests, but as several manufacturers have already expressed a desire to give this new valve a trial, I hope before long to be able to make public the results of such a test.

Fig. 1 illustrates diagrammatically how I applied this valve mechanism to the Rochet-Schneider engine.*

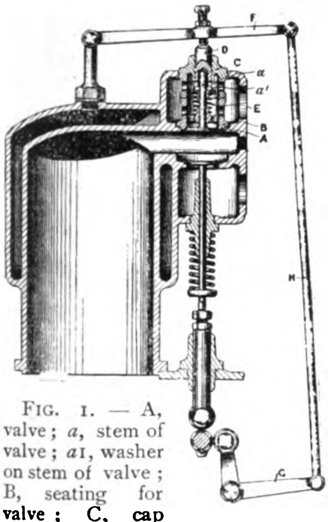

FIG. 1. — A, valve; *a*, stem of valve; *a*1, washer on stem of valve; B, seating for valve; C, cap locking valve-seating in position; D, plunger; E, spring retaining valve on its seating; F, rocking lever operating plunger; G, bell-crank lever operated by exhaust cam; H, rod connecting bell-crank lever G with rocking lever E.

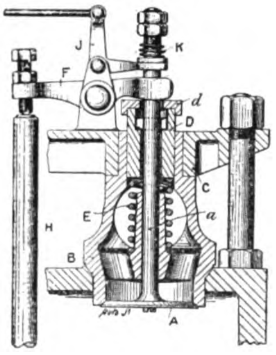

FIG. 2.—A, valve; *a*, valve stem; B, valve seating; C, stirrup retaining seating of valve in position; D, plunger working in upper part of seating; E, spring retaining valve on its seating; F, rocking lever engaging plunger; H, rod operating rocking lever F; J, device for varying lift of valve; K, spring acting as cushion to break fall of valve.

Fig. 2 shows the valve designed for application to the engine of a well-known car. In this construction the stem *a* of the valve passes freely through the plunger, D, so that the said plunger performs also the function of the washer a^1, the cottar locating its normal position with respect to the stem of the valve, fitting in a recess in the top end of the plunger. The end of the lever, F, is forked to clear the stem of the valve, and engages a cap, *d*, closing the recess in the top of the plunger. The bell-crank lever, J, provides a simple means of throttling the volume of the charge by varying the amount the valve can open. The function of the small spring, K, located under the nuts on the end of the stem of the valve, is to act as a cushion to break the fall of the valve when opening.

Fig. 3 shows a modified arrangement, in which the controlling spring, E, is arranged outside the valve-box, which renders it more accessible. The spring in this case, instead of acting between the valve and its seating, acts on the valve through the rocking lever, F. To force the valve from its seating, should it have "stuck up," a collar, L, is fixed on the stem of the valve at such a distance below the operative end of the rocking lever, F, as will cause the said lever to contact the collar at a time subsequent to the time when the valve should open under normal conditions, in case it has not left its seating.

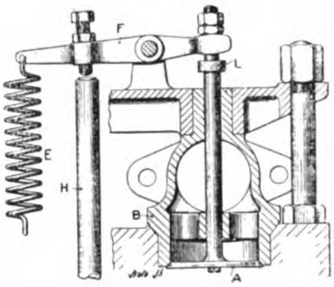

Fig. 3.—A, valve; B, seating for valve; E, spring retaining valve on its seating; F, rocking lever engaging stem of valve; H, rod operating rocking lever; L, collar on stem of valve for rocking lever to engage with in case valve has "stuck up" on its seating.

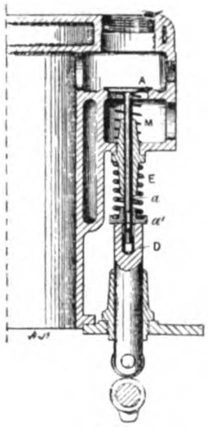

FIG. 4.—A, valve; *a*, stem of valve; *a*1, washer on stem of valve; D, plunger formed in one with the lifter or striker operated by cam; E, spring retaining valve on its seating; M, spring operating to balance valve, and assisting it in opening.

The valve is preferably arranged to open downwards, so that it opens by gravity; but when, for constructional reasons, it is arranged to open upwards a spring, M, is employed to lift it as shown in Fig. 4, the strength of the spring being such that it slightly more than balances the weight of the valve. In this construction the plunger, D, can conveniently be formed in one with the striker or lifter contacting the operating cam.

In engines with four or more cylinders the necessary motion for operating the springs of the induction valves can be taken direct from the lifters or strikers of the exhaust valves, thereby materially reducing the number of working parts. One method of doing this is illustrated by Fig. 5. It will be seen that the strikers or lifters of the exhaust cam of No. 1 cylinder operate the inlet valve of No. 2 cylinder, that of the exhaust valve of No. 2 cylinder the inlet valve of No. 4 cylinder, that of the exhaust valve of No. 3 cylinder the inlet valve of No. 1 cylinder, and that of the exhaust valve of No. 4 cylinder the inlet valve of No. 3 cylinder. The simplicity of this arrangement is so obvious that further comment is unnecessary.

I think it will be conceded that this valve has several advantages over the types of valves at present in use. In the first place, its efficient action is not affected by loss of compression in the cylinder, but, on the other hand, to some extent compensates for it. Secondly, it cannot open at any other than the correct time, owing to its automatic action being dependent on the conditions that govern the correct time of opening. Thirdly, it automatically adjusts itself to its work, and consequently continued use and wear do not affect its opening at the correct time; and, fourthly, in engines having four or more cylinders a considerable number of working parts—as compared with the present mechanically-operated valves—can be dispensed with.

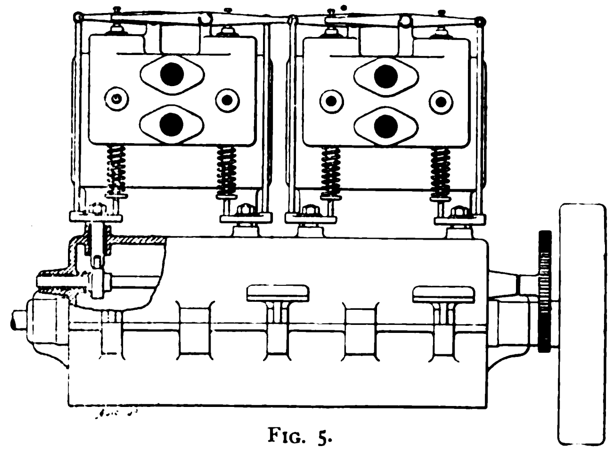

FIG. 5.

These advantages will appeal to both users and manufacturers. The former will appreciate the fact that the valve requires no attention other than grinding in, and the latter cannot afford to

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*An illustrated description of this valve and its operating mechanism was given in THE AUTOMOTOR JOURNAL on October 31st last.—Ed.

STATISTICAL DATA RELATING TO TYPICAL PETROL ENGINES.

Given in Mr. Phillips' Paper.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
							Piston speed, in feet per minute.						Charge velocity through valve, in feet per second.			Charge velocity through pipe, in feet per second.					Exhaust velocity through valve, in feet per second.			Exhaust velocity through pipe, in feet per second.	
Car.	Horse-power.	Number of cylinders.	Diameter of cylinders.	Stroke.	Revolutions per minute.	Volume swept by piston, in cubic inches.	Mean.	Maximum.	Type of admission valve.	Diameter of admission valve.	Lift of admission valve.	Area of charge inlet port at maximum opening of valve.	Mean.	Maximum.	Area of induction pipe.	Mean.	Maximum.	Diameter of exhaust valve.	Lift of exhaust valve.	Area of exhaust port at maximum opening of valve.	Mean.	Maximum.	Area of exhaust pipe.	Mean.	Maximum.
Humber	2¾	1	3·12	4	1800	30·56	1200	1885	A	1·18	·09	·333	458	719	·441	—	—	1·25	·25	·98	155	243	·477	320	502
Quadrant	3	1	3·11	3·14	1800	23·83	942	1480	A	·984	·275	·849	140	220	·439	272	427	·984	·275	·849	140	220	·817	146	229
Ariel	3½	1	3·22	2·91	1700	24·68	824	1294	M	1·37	·218	·937	119	187	·601	186	292	1·37	·281	1·2	93	146	·785	142	223
Minerva	3½	1	3·22	3·22	1300	26·21	697	1095	M	1·18	·354	1·3	70	110	·754	125	196	1·18	·354	1·3	70	110	1·09	86	135
Coronet	4	1	3·18	3·18	1800	25·24	954	1499	M	1·18	·25	·925	136	213	1·47	—	—	1·18	·25	·925	136	213	1·47	—	—
Roots	5	1	4·7	5	750	86·7	625	982	A	1·12	·125	·438	412	647	·594	—	—	1·43	·406	1·82	99	155	1·60	112	176
Oldsmobile	5	1	4·5	6	400	95·4	400	628	M	1·12	·25	·877	121	190	·88	—	—	1·12	·25	·877	121	190	·98	—	—
De Dion	6	1	3·54	4·33	1700	42·6	1226	1926	A	1·29	·118	·477	422	663	·528	—	—	1·25	·196	·768	261	410	·58	346	543
Siddeley	6	1	4·5	5	800	79·5	666	1046	A	1·87	·25	1·46	120	188	1·5	—	—	2	·375	2·35	75	117	1·91	92	144
Star	6	1	4	4	1200	50·24	800	1257	A	1·25	·156	·611	274	430	·785	—	—	1·5	·312	1·46	114	179	1·76	—	—
Vauxhall	6	1	4	5	950	62·8	791	1243	A	1·5	·25	1·17	141	221	·44	376	591	1·5	·25	1·17	141	221	·785	211	331
Gladiator(Aster)	6½	1	3·46	4·33	1400	40·7	1010	1587	A	1·14	·118	·422	376	590	·817	—	—	1·18	·236	·873	189	297	1·09	—	—
Cadillac	6½	1	5	5	800	98·15	666	1046	M	1·37	·187	·804	270	424	1·22	—	—	1·37	·25	1·07	203	319	1·76	—	—
Humber	6½	1	3·87	4	1500	47·04	1000	1571	A	1·5	·125	·588	333	523	·644	—	—	1·5	·25	1·17	168	264	·985	199	312
Renault	7	1	3·93	4·72	1500	57·25	1180	1854	A	1·77	·157	·872	274	430	·817	292	458	1·65	·236	1·22	195	306	·817	292	458
De Dion	8	1	3·93	4·72	1600	57·25	1258	1976	A	1·45	·157	·714	356	559	·817	—	—	1·37	·196	·842	302	486	1·56	—	—
M.M.C.	8	1	3·93	5·11	1300	61·98	1105	1736	M	1·57	·315	1·55	144	226	1·47	151	237	1·57	·315	1·55	144	226	1·47	151	237
Wolseley	8	2	4	4	900	50·24	600	942	A	1·62	·125	·635	199	312	1·47	—	—	1·75	·375	2·05	61	95	2·06	—	—
Clement (Aster)	9–11	2	3·46	5·51	1200	51·79	1102	1731	M	1·18	·236	·873	198	311	1·93	—	—	1·18	·236	·873	198	311	1·93	—	—
James & Brown	9	2	4	6	700	75·36	700	1100	A	1·87	·093	·545	268	421	1·47	—	—	1·5	·375	1·76	83	130	1·76	—	—
Star	7–9	2	4	4·5	1000	56·52	750	1178	M	2·12	·312	2·07	75	117	1·76	89	139	1·5	·312	1·46	107	168	1·76	—	—
Clement (Aster)	10	4	3·30	4·72	1000	40·35	786	1235	M	1·18	·236	·873	128	201	1·38	—	—	1·18	·236	·873	128	201	1·38	—	—
Coronet	10	1	4·37	5·12	1200	76·74	1024	1609	M	1·62	·312	1·58	161	253	2·74	—	—	1·62	·312	1·58	161	253	2·74	—	—
De Dion	10	2	3·54	4·33	1500	42·6	1082	1700	A	1·25	·118	·462	384	603	·535	—	—	1·29	·196	·793	224	352	1·02	—	—
Duryea(U.S.A.)	10	3	4·5	4·5	700	71·55	525	824	A	1·25	·125	·49	283	444	1·09	—	—	1·37	·375	1·61	86	135	1·47	94	147
M.M.C.	10	2	3·93	5·11	1050	61·98	894	1405	M	1·57	·315	1·55	116	182	1·47	122	191	1·57	·315	1·55	116	182	1·47	122	191
Renault	10	2	3·93	4·72	1400	57·25	1101	1730	A	1.77	·157	·872	255	400	·817	272	427	1·65	·236	1·22	182	286	·817	272	427
Ryknield	10	2	4	4·5	1000	56·52	750	1178	M	2	·218	1·36	115	180	1·22	128	201	2	·25	1·57	100	157	2·74	—	—
Sunbeam	10	4	3·14	4·72	800	36·53	629	988	A	1·25	·315	1·23	65	102	·76	106	166	1·18	·315	1·16	69	108	·95	85	133
Thornycroft	10	2	4	4·37	900	54·88	655	1029	A	1·37	·156	·670	204	320	1·22	—	—	1·25	·312	1·22	112	176	1·22	—	—
Talbot	11	2	3·54	4·72	1500	46·44	1180	1854	M	1·29	·275	1·11	174	273	·76	254	399	1·29	·275	1·11	174	273	1·83	—	—
Albion	12	2	4·5	5	700	79·5	583	916	M	1·62	·312	1·58	97	152	1·22	126	198	1·62	·437	2·21	79	124	1·76	100	157
Blake	12–18	4	3·54	4·01	950	39·45	634	996	A	1·25	·187	·733	142	223	·601	173	271	1·25	·312	1·22	85	133	1·22	—	—
Brooke	12	3	3·62	4·75	900	48·87	712	1118	A	1·31	·25	1·02	119	187	1·22	—	—	1·37	·375	1·61	75	117	2·40	—	—
Brooke	12	3	3·62	4·75	900	48·87	712	1118	M	1·37	·375	1·61	75	117	1·22	100	157	1·37	·375	1·61	75	117	2·40	—	—
Clement (Aster)	12	4	3·46	5·11	1000	48·03	851	1337	M	1·18	·236	·873	153	240	1·93	—	—	1·18	·236	·873	153	240	1·93	—	—
De Dion	12	2	3·93	4·33	1500	52·52	1082	1700	A	1·45	·157	·714	306	480	·817	—	—	1·37	·196	·842	259	407	1·74	—	—
Duryea (Brit.)	12	3	4·5	4·5	600	71·55	450	707	M	1·75	·31	1·70	70	110	2·06	—	—	1·75	·31	1·70	70	110	3·14	—	—
Forman	12	4	3·14	3·14	1500	24·30	785	1233	A	1·25	·157	·615	164	257	·76	—	—	1·25	·157	·615	164	257	·76	—	—
Gladiator(Aster)	12	2	4·13	5·11	1200	68·42	1022	1606	A	1·96	·196	1·20	190	298	1·74	—	—	1·65	·315	1·63	140	220	2·68	—	—
James & Brown	12	4	3·5	4·5	800	43·29	600	942	A	1·87	·093	·545	176	276	1·47	—	—	1·5	·375	1·76	54	85	1·76	—	—
Pipe	12	4	3·14	4·88	1200	37·77	976	1533	M	·866	·275	·759	166	260	·589	214	330	·866	·354	·977	129	202	1·93	—	—
Rex	12	2	4·5	4·5	1000	71·55	750	1178	A	1·56	·156	·764	260	408	1·76	—	—	1·59	·437	2·18	91	143	2·06	96	151
Richardson	12	2	4	4·75	900	59·66	712	1119	M	1·62	·25	1·27	117	183	1·34	—	—	1·62	·312	1·58	94	147	1·91	—	—
Siddeley	12	2	4·5	4·5	900	71·55	675	1060	M	2	·218	1·36	131	205	1·76	—	—	2	·375	2·35	76	119	2·40	—	—
Standard	12–15	2	5	3	1200	58·89	600	942	M	1·37	·375	1·61	121	190	·985	199	312	1·37	·375	1·61	121	190	1·09	180	282
Star	12–16	4	3·5	4·5	1000	43·29	750	1178	M	2·12	·312	2·07	58	91	1·76	68	107	1·25	·312	1·22	98	154	1·22	—	—
Wilson and P.	12	4	3·75	3·75	1000	41·40	625	982	A	1·4	·1	·439	261	410	·708	—	—	1·2	·25	·942	122	191	1·13	—	—
Roots	12–13	2	5·12	6	750	123·48	750	1178	M	1·62	·312	1·58	162	254	1·22	210	330	2	·5	3·14	81	127	3·14	—	—
Gladiator(Aster)	14	4	3·46	5·11	1200	48·03	1022	1606	M	1·18	·275	1·01	158	248	1·74	—	—	1·18	·275	1·01	158	248	3·01	—	—
Humber	14	4	3·62	4	1000	41·16	666	1046	A	1·37	·125	·537	212	333	·985	—	—	1·37	·25	1·07	106	166	1·76	—	—
Renault	14	4	3·54	4·72	1200	46·44	914	1483	M	1·49	·275	1·28	120	188	·817	189	297	1·49	·275	1·28	120	188	1·09	142	223
Talbot	14	4	3·14	4·72	1200	36·53	944	1483	M	1·18	·255	·943	129	202	·75	162	254	1·18	·255	·943	129	202	1·83	—	—
Ariel	15–19	4	3·5	3·75	1400	36·07	875	1374	M	1·25	·218	·854	164	257	·833	168	264	1·25	·218	·854	164	257	·833	168	264
Belsize	15–20	3	4·5	5	1000	79·5	833	1309	M	1·37	·187	·804	275	432	1.47	—	—	1·37	·187	·804	275	432	1·47	—	—
Napier	15	4	3·5	4	1200	38·48	800	1257	M	1·62	·25	1·27	101	158	·985	130	204	1·59	·375	1·87	68	107	·985	130	204
New Orleans	15	4	3·93	4·33	900	52·52	649	1019	A	1·37	·118	·507	259	407	·760	—	—	1·37	·23	·989	132	207	·950	138	217
Pipe	15–21	4	3·54	5·11	1100	50·28	936	1470	M	·944	·275	·814	188	295	·81	—	—	·944	·354	1·04	147	231	1·93	—	—
De Dietrich	16	4	4·09	4·72	650	61·97	511	802	A	1·81	·156	·886	126	198	1·76	—	—	1·81	·375	2·13	52	81	2·40	—	—
Fiat	16–20	4	4·33	4·33	1000	63·73	721	1133	M	1·37	·236	1·01	175	275	1·30	—	—	1·37	·236	1·01	175	275	1·30	—	—
G.-R. Brazier	16	4	3·34	3·93	1200	34·42	786	1235	M	1·49	·236	1·10	104	163	·76	150	235	1·49	·236	1·10	104	163	·882	130	204
Germain	16	4	3·74	5·11	850	55·69	724	1137	M	·905	·354	1	131	205	·486	270	424	·905	·354	1	131	205	1·47	—	—
Rochet & Sc'er	16–22	4	3·93	5·51	900	66·83	826	1298	M	1·65	·236	1·22	136	225	1·09	153	240	1·65	·236	1·22	136	225	1·22	—	—
Siddeley	16	4	4	4	900	50·24	600	942	M	1·75	·187	1·02	123	193	1·47	—	—	1·75	·375	2·05	61	95	1·47	85	133

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Sunbeam .	16	6	3·14	4·72	800	36·53	629	988	M	1·18	·315	1·16	70	110	·75	108	169	1·18	·315	1·16	70	110	·95	85	133
Ariel	18–22	4	3·5	4	1400	38·48	933	1466	M	1·31	·218	·89	167	262	·882	170	267	1·31	·218	·895	167	262	·882	170	267
Blake	18–22	4	4·13	4·72	750	63·2	590	927	M	1·43	·25	1·12	117	183	1·22	—	—	1·5	·312	1·46	90	141	1·76	—	—
Daimler ...	18	4	3·74	5·11	800	56·10	681	1070	M	1·25	·27	1·05	118	185	1·38	—	—	1·25	·27	1·05	118	185	1·38	—	—
James & Brown	18	4	4	6	700	75·36	700	1100	M	1·87	·25	1·46	100	157	1·47	—	—	1·5	·375	1·76	81	127	1·76	--	—
Maudslay ...	18–22	3	5	3·5	800	68·7	466	732	M	1·62	·375	1·90	80	125	1·47	103	161	1·62	·375	1·90	80	125	1·47	103	161
Star	18–22	4	4	4·5	1000	56·52	750	1178	M	2·12	·312	2·07	75	117	1·76	89	139	1·5	·312	1·46	107	168	1·76	—	—
Mors	19	4	4·13	5·70	1100	76·32	1045	1567	M	1·49	·275	1·28	182	286	1·22	191	299	1·49	·275	1·28	182	286	1·38	—	—
Clement (Vinot-Deguingand)	20	4	4·05	5·11	1000	65·81	851	1337	M	1·77	·315	1·75	104	163	2·46	—	—	1·77	·354	1·96	93	146	2·46	—	—
Forman ...	20	4	4·13	4·33	800	57·97	577	906	A	1·65	·236	1·22	105	165	·985	130	204	1·65	·236	1·22	105	165	1·22	—	—
Martini ...	20	4	3·93	5·11	1100	61·98	938	1474	M	1·57	·27	1·33	142	223	1·09	174	273	1·57	·27	1·33	142	223	1·22	155	243
Mercedes ...	20–24	4	3·93	5·11	900	61·98	766	1203	M	1·41	·315	1·39	111	174	1·09	142	223	1·41	·315	1·39	111	174	1·22	126	198
Pipe	20–28	4	3·93	5·31	1100	64·41	973	1529	M	1·18	·275	1·01	194	304	1·09	—	—	1·18	·354	1·30	151	237	1·93	—	—
Thornycroft . .	20	4	4	4·37	900	54·88	655	1029	A	1·37	·156	·67	204	320	1·22	—	—	1·5	·312	1·46	93	146	1·76	—	—
Coronet ...	21	4	3·75	4·37	1000	48·24	728	1144	M	1·5	·312	1·46	91	143	2·40	—	—	1·5	·312	1·46	91	143	2·40	—	—
De Dietrich ...	24	4	4·72	4·72	650	82·55	511	803	A	2·09	·156	1·02	146	229	1·47	—	—	2·37	·375	2·79	53	83	2·74	54	85
Fiat	24–35	4	5·11	5·11	1000	104·75	851	1337	M	1·53	·236	1·13	257	403	1·65	—	—	1·53	·236	1·13	260	408	2·68	—	—
Germain ...	24	4	4·52	5·51	850	88·38	780	1225	M	1·18	·354	1·30	160	251	·81	257	403	1·18	·354	1·30	160	251	1·93	—	—
Rochet and S.	24–30	4	4·33	5·90	800	86·84	786	1235	M	1·73	·236	1·28	150	235	1·47	—	—	1·73	·236	1·28	150	235	1·47	—	—
Wilkinson De Cosmo	24	4	3·93	5·12	900	62·10	768	1206	A	1·50	·125	·58	264	414	·88	—	—	1·34	·187	·785	198	311	1·60	--	—
Wolseley ...	24	4	4·5	5	800	79·5	666	1046	A	1·87	·156	·91	193	301	1·76	—	—	2	·375	2·35	75	117	2·06	85	133
Humber ...	25	4	4·5	5·75	900	91·42	862	1354	M	1·75	·312	1·71	133	209	1·34	170	267	1·68	·312	1·64	139	218	3·52	—	—
Daimler ...	28	4	4·33	5·9	750	86·84	737	1158	M	1·37	·275	1·18	152	238	1·56	—	—	1·37	·275	1·18	152	238	1·56	—	—
Maudslay ...	25–30	3	5	5	700	98·15	583	916	M	1·62	·375	1·90	100	157	2·40	—	—	1·62	·375	1·90	100	157	2·40	—	—
Napier... ...	30	4	5	5	1000	98·15	833	1309	A	1·31*	*·125	2·05	132	207	2·74	—	—	2·43	·437	3·33	81	127	2·74	99	155
Pipe	30–38	4	5·03	5·51	1000	109·48	918	1442	M	1·57	·275	1·35	225	353	1·74	—	—	1·57	·354	1·74	174	273	1·93	—	—
Blake	40	4	5·31	6·29	600	139·26	629	988	M	1·93	·375	2·27	102	160	2·74	—	—	1·93	·375	2·27	102	160	3·52	—	—
Wolseley ...	50	4	6	7	850	197·89	991	1557	A	2·56	·25	2·01	232	364	2·74	—	—	2·5	·5	3·92	119	187	3·14	148	232
Mercedes ...	60	4	5·51	5·9	1000	140·65	983	1544	M	3·46, 1·92	·157	2·64	147	231	1·74	224	352	1·96	·315	1·93	202	317	2·46	—	—

* There are four valves to each cylinder.

overlook the fact that, quite apart from any increased efficiency of the engine produced by the use of this valve, its use effects a considerable saving of time in tuning up an engine.

Many attempts have been made to obtain the motion necessary to actuate mechanically-operated induction valves from the cams operating the exhaust valves, but none that I have seen can be considered as practical, as none of them provide for the independent adjustment of the timing of the two valves. By eliminating one adjustment, as is possible in the auto-mechanical valve, the thing becomes feasible. Having adjusted the exhaust valve to open and close at the correct time, all that remains to be done is to adjust the time of closing the induction valve, as the time of opening of the said valve calls for no adjustment.

It must be borne in mind that the relative efficiency of any two types of valves cannot be correctly compared even when tested in the same engine, unless the carburetter employed is tuned up to suit the altered conditions; and it is probable, however, neglecting this fact, that some makers have failed to get better results from mechanically-operated valves than from atmospheric valves.

It is hardly necessary to point out that the best designed valve will be inefficient, unless the ports and pipes are properly proportioned. In order to show the present practice as regards the sizes of valves and pipes, I have prepared the annexed table.

In this table the diameters of the valves given are the diameters at the inner edge of the seating, and the mean and maximum velocities of both the charge and of the exhaust through the pipes are only given in those cases where the area of the pipe is less than that of the passage by the valve at its maximum lift.

It will be seen that the mean charge velocity through the most restricted area ranges from 58 ft. to 448 ft. per second. The mean exhaust velocity through the most restricted area varies from 52 ft. to 346 ft. per second.

36 of the engines are fitted with atmospheric induction valves, and 57 with mechanically-operated ones.

It will be seen to what extent some engines are throttled by reason of the small pipes employed. One of the worst offenders in this respect has a mean velocity of the charge through the inlet port of 141 ft. per second, and through the induction pipe 376 ft. per second.

CORRESPONDENCE.

⁂ *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letter intended for insertion, or containing queries.*

THE FUTURE OF THE AUTOMOBILE CLUB.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—Several friends having written to me about my nomination on the Reform Committee, I desire to state, in order not to cause any misapprehension, that I was approached by the Hon. John Scott Montagu to stand for election on his proposed committee in my capacity as President of the Society of Motor Manufacturers and Traders. Personally, owing to the many claims upon my time, I have no desire or ambition to serve on the committee, although, perhaps, to some it might not appear unreasonable that the founder of a club, during whose three years' vice-chairmanship the club was decidedly successful, might be the holder of some honorary office in the club.

With regard to the Reform Committee, although it is impossible to entirely agree with the personnel of any such large committee nominated by someone else, I believe the said committee, if elected, would do useful and safe work for the club.

I truly hope, for the prosperous future of the club, that Lord Shrewsbury's well meant but unpractical resolution will not be carried, but that of Mr. Jarrott, who puts the truth in a nutshell. If the Automobile Club shall be reduced to a club of amateurs pure and simple we can hardly expect any public body to continue to recognise it as a practical authority governing automobilism in this country. No matter which gentlemen happen to be elected on the new committee, a few more such balance-sheets as the present one, with a deficit of some £1,700 (seventeen hundred pounds), cannot fail to bring about what I ventured to predict three years ago, viz.:—

Firstly.—The reconstruction of the Automobile Club into a high-class social and amateur club, with a high entrance and subscription fee, eliminating all elements socially ineligible, and dealing with all matters of automobilism as a sport and pastime.

Secondly.—The Motor Union becoming the practical body governing automobilism as a society of encouragement, and taking under its immediate care and protection at a moderate fee all motorists, of which there will be millions in time to come.

Thirdly.—The Society of Motor Manufacturers and Traders, as a strong and consolidated body, dealing with all matters pertaining to trade questions.

I am, Sir, yours faithfully,
FREDERICK R. SIMMS.

6, Charles Street, Berkeley Square, W.

RACES, RECORDS, AND TRIALS.

FRENCH FUEL CONSUMPTION AND RELIABILITY TRIALS.

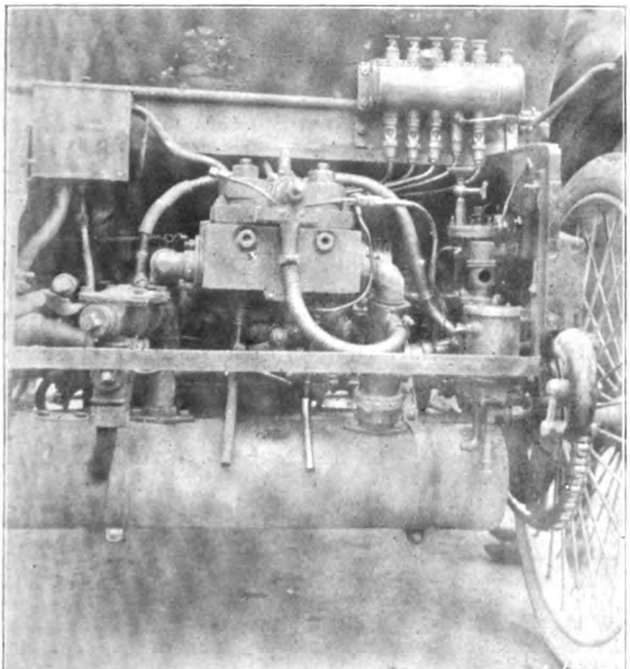
No less than forty-three vehicles were entered for the three days' trials organised by *L'Auto* under the patronage of the A.C. of France. The three classes into which the vehicles were divided were run off on Thursday, Friday, and Saturday last week, the Tourist Vehicle Class occupying the first and second days, the Industrial Vehicles and Heavy Wagons competing on the third day. A remarkable record was scored on the first day when the classes ranging from 5,000 francs to 12,000 were run off—17 cars were entered, 17 competed, and 17 successfully completed the full journey. Upon each day the time of every vehicle was taken, both on the outward and return journey, on the Picardie Hill, which was wearing its winter garb, as will be seen in our photographs of the scene published this week. The journey on the two first days was from Suresnes to Corbeil and back, a distance of 100 kiloms., and the industrial vehicles were required on Saturday to cover 60 kiloms., the turning point selected being Longjumeau. Cold but splendid weather was experienced throughout, and helped considerably to the success of the meeting. Interest was largely centred upon the Chenier-Lion entry of an old-type Peugeot car fitted with a special vaporising carburettor, which used a different fuel each day with surprising results. The fuel selected for the first day was paraffin oil, the second Autun shale oil, and for the third naphthaline. Although the car was not officially classed, it was permitted to run in order that a record might be obtained of the performance of the vaporising carburettor under the exceptional conditions of running, without any special change, on the three types of fuels already mentioned. The results obtained certainly appear to be of considerable value. In regard to speed the average over the full run was recorded, and also the speed on Picardie Hill was taken over 500 metres with a flying start, and also from a standing start, marks in each case being allotted.

All the vehicles used petroleum spirit as fuel, with the exception

Results of French Consumption and Reliability Trials.

No.	Make.	Weight in kilogs.		Speed in kiloms.			Fuel consumption in litres.	Points.					
					On hill of 500 m.			For weight (in kilogs.).		For speed.			Total.
		Light.	Useful load.	Average for 100 kiloms.	Flying start.	Standing start.		Total.	Useful load.	Average for 100 kiloms.	On hill of 500 m. Flying start.	Standing start.	
	Passenger Vehicles.												
	CATEGORY I.—*Price of chassis less than 5,000 francs.*												
12	Peugeot	610	265	over 25	13·8	14·5	5·60	64·0	211	0	81·0	155	511·0
13	Peugeot	511	264	,,	14·5	12·9	5·42	69·9	205	0	77·5	181	533·4
43	Fouillaron	695	305	,,	16·5	17·0	9·13	91·3	299	0	67·5	136	593·8
36	Boyer	665	120	,,	18·3	12·8	5·08	64·7	423	0	58·5	182	728·2
38	Bolide	690	285	,,	12·0	11·8	12·90	132·9	464	0	90·0	192	878·9
24	P. Roy	680	220	,,	20·1	18·5	13·94	154·4	633	0	49·5	115	951·9
	CATEGORY II.—*Price of chassis 5,000 to 8,000 francs.*												
7	Creanche	810	320	over 25	27·4	26·2	7·63	67·4	238·4	0	13·0	38	356·8
1	Chenard-Walcker ...	945	265	24·8	18·1	16·4	8·56	70·7	323·0	5	59·5	136	594·2
6	Creanche	753	285	over 25	19·1	22·2	10·88	105·6	382·0	0	54·5	78	620·1
33	Vivinus	760	320	,,	over 30	20·9	12·00	115·0	429·0	0	0	91	635·0
39	Vinot-Deguingand	1000	315	,,	,,	24·6	11·33	92·4	531·0	0	0	54	677·4
27	Aries	882	300	,,	14·5	14·5	13·55	114·3	451·8	0	72·5	155	793·1
37	Boyer	1335	283	,,	17·4	17·4	15·75	97·0	556·5	0	63·0	126	842·5
	CATEGORY III.—*Price of chassis 8,000 to 12,000 francs.*												
42	Creanche	1220	240	over 25	over 30	21·7	9·77	75·0	349	0	0	83	507·0
28	Aries	1042	360	,,	21·9	19·0	10·21	72·9	283	0	41·5	120	517·4
40	Vinot-Deguingand	1080	303	,,	25·7	25·3	18·1	131·0	597	0	21·5	47	796·5
	CATEGORY IV.—*Price of chassis 12,000 to 18,000 francs.*												
25	Peugeot	1162	488	over 25	—	—	14·7	88·0	300	0	25	62·5	475·5
	CATEGORY V.—*Price of chassis 18,000 to 25,000 francs.*												
18	Automotrice ...	1258	382	over 25	—	—	14·7	89·0	384	0	0	80·0	553·0
	Industrial Vehicles (60 KILOMS, ONLY).												
	CATEGORY I.—*Wagons carrying more than 1 ton.*												
					Total time for 60 kiloms. hrs.	mins.							
15	Peugeot	1680	3000	13·5	4	26	16·11	34·37	53·7	37·5	81	—	206·97
20	Baden	1735	1313	12·0	4	54	16·67	57·78	126·6	75·0	108	—	364·38
10	Gillet-Forest ...	1476	1504	10·4	5	44	17·40	54·10	115·2	115·0	164	—	452·60
	CATEGORY II.—*Wagons carrying less than 1 ton.*												
11	Gillet-Forest ...	837	787	12·3	4	53½	10·68	69·6	135	67·5	108	—	380·1
	CATEGORY III.—*Delivery vans carrying less than 500 kilogs.* (*quick service*).												
29	Aries	963	322	16·0	3	43	7·3	57·0	228	0	0	—	285·0
	CATEGORY IV.—*Delivery vans carrying 500 to 1,000 kilogs.*												
9	Gillet-Forest ...	880	570	12·5	4	49	9·5	65·4	166·8	62·5	78	—	372·7

FRENCH CONSUMPTION AND RELIABILITY TRIAL.—M. Tampier, the official Timekeeper of the A.C. de France, at his post at the top of the Picardie Hill.



FRENCH CONSUMPTION AND RELIABILITY TRIAL. —A view of the Chenier-Lion special vaporising carburettor, which employed a different fuel on each of the three days' runs, viz., first day, paraffin oil; second, Autun shale oil; and on the third day naphthaline.

of the Chenier-Lion car, as already explained, and the Gillet-Forest No. 10 wagon, which used paraffin oil.

We publish the official figures for the various classes for the three days' trials.

In judging the performances of the various vehicles the rules provided that marks should be given for their disadvantages only, therefore the car which receives the least number of marks is awarded first place in the results. The marks are arrived at as follows :—

PASSENGER VEHICLES.

1. *For the consumption per ton of total weight*, the marks are the number of litres consumed divided by the total weight in tons and multiplied by the co-efficient 10.
2. *For the consumption per ton of useful load*, the marks are the number of litres consumed divided by the useful load in tons and multiplied by the co-efficient 10.
3. *Regularity of running and mean speed.*—No competitor, who gets over the course in less than four hours (an average speed of 25 kilometres) is penalised, but every car that goes at a lower average speed than 25 kilometres is penalised as follows: the difference between the average speed of the vehicle and the minimum average speed demanded will be expressed in kilometres and multiplied by the co-efficient 25, and the resulting number deducted from the marks obtained.

Hill-climbing.—The average speed on Picardie Hill must be more than 30 kiloms. per hour, otherwise marks are allotted as in (3), but with a co-efficient 5 for flying starts and 10 for standing starts. Cars on the outward journey take the hill with a flying start, and on the return journey with a standing start.

INDUSTRIAL VEHICLES.

Marks are arrived at for 1 and 2 as above.

3 is the same except that the route in this case was only 60 kiloms., and the minimum average speed 15 kiloms. per hour.

Hill-climbing.—As before, except that the minimum speed was 12 kiloms. per hour and the vehicles take the hill with a flying start on both occasions. Marks are calculated as above, but with a co-efficient 10.

Messrs. Chenier and Lion ran the 100 kiloms. on the first day at a consumption of 14·81 litres of ordinary lamp oil (kerosene), on the second day they did the same distance with 12·17 litres of Autun shale oil, and on the third day they ran 60 kiloms. in 2 hrs. 20 mins. on a consumption of 6 kilogs. of naphthaline.

In working with naphthaline, Messrs. Chenier and Lion carry the naphthaline in small pieces in a solid form in a reservoir above an inlet tube, into which it drops piece by piece, and is there liquified, the intake pipe being exhaust-jacketed, the liquified naphthaline being in consequence sprayed direct into the working cylinder through the induction valve.

Naphthaline, with which many of our readers are probably familiar in the little white lumps in which it used to be sold for the albo-carbon gas light, is a by-product obtained in distilling benzine from coal tar. Its chemical formula being $C^{10} H^{8}$. It melts at 80° C. and boils at 218° C., but it volatilizes a good deal below the temperature of boiling water.

Versailles Anti-Skid Awards.—The marks obtained and the awards are officially issued in these trials, particulars of which we recorded last week. The classing according to the points gained by each device is as follows:—1. Gallus ferré (395 points); 2. Lempereur (368); 3. Gallus demi-ferré (361); 4. De Fornier (345); 5. Bergougnan (336); 6. Fouilloy (320); 7. Durandal (310); 8. Lucas (290); 9. Houben (284); 10. Clerget (251); 11. Excelsior (250).

The awards are:—

Category A. *Removable anti-skid devices.*—1. Lempereur; 2. De Fornier; 3. Fouilloy; 4. Durandal; 5. Houben; 6. Excelsior.

Category B. *Anti-skid tyres.*—1. Gallus ferré; 2. Gallus demi-ferré; 3. Bergougnan; 4. Lucas; 5. Clerget.

Category C. *Smooth Tyres fitted with anti-skid devices.*—1. Eyquem; 2. Moche; 3. Sainsbury.

Category D. *Non-skids for motor bicycles.*—1. Bergougnan; 2. Durandal; 3. Lucas; 4. Billet.

Some of the competitors have not been classed by the jury, owing to accidents other than to the anti-skid devices themselves. This applies to the Chameroy, which is being permitted to complete the trials; to the Samson Tyre and the Billet Tyre, both the cars on which these tyres were fitted having continually broken down, thus preventing the tests being completed.

May 1st has been fixed by the A. C. de France for the commencement of this year's competition for carburettors.

Amongst the first list published of the entries for the Nice automobile week, commencing on March 22nd, are the names of Lieut.-Col. Mark Mayhew and Mr. S. F. Edge, both with 80-h.p. Napier cars, and Mr. Andrew Fletcher, with an 80-h.p. Mercedes. Five other 80-h.p. Mercedes cars are also included in this list, entered respectively in the names of Baron de Caters, Messrs. Warden, Jenatzy, Braun and Werner.

As we mentioned last week, the organisers of the Versailles anti-skid trials suggested that the tests should be continued by running the cars for some lengthy distance for the purpose of testing the durability of the various anti-skid devices. Several competitors at once accepted this further test, and it has now been decided that a start shall be made from Versailles on March 25th, the cars to run to Nice in time for the Monte Carlo week. The entrance fees have been fixed at 100 francs per car.

In our notice last week of the Edinburgh Motor Show, by an oversight reference to the well-arranged stand of the Ariel Motor Company, Limited, was omitted in the text. This stand, which occupied a space right in the centre of the Centre Hall during the week, drew a very large number of visitors, who critically examined the perfect workmanship of the section chassis on view, which was one of the features of the Crystal Palace Exhibition. In addition, the Company had staged a 15-h.p. standard tonneau car, and the identical vehicle which climbed Snowdon recently, a series of photographs taken on this trip forming an additional attraction.

CLUB DOINGS.

Derby and District Automobile Club.—The inaugural run of the season took place on Saturday last, under very adverse climatic conditions. A number of members were in addition prevented from attending owing to an important football match in the district. Ashbourne was selected as the destination for the afternoon's run, and those who took part in the journey included Messrs. H. H. Raphael (9-h.p. De Dion), C. L. Schwind (16-h.p. Rex), Le Fanu (10-h.p. White), C. T. Leech (6-h.p. Regal), J. Hill (12-h.p. Chatsworth), G. B. Fletcher (9-h.p. Mohawk), these being joined at Ashbourne by Messrs. Francis Bolton (16-h.p. Daimler), and H. S. Chaplin (12-h.p. Panhard). The route was *viâ* Hulland to the Ashbourne Hall Hotel, from whence, owing to the bad state of the weather and the greasy condition of the roads, each of the members departed for their respective destinations instead of returning *en masse* to the club's headquarters.

Herefordshire Automobile Club.—A list of fixtures has been issued by the club for the coming season. The first run was on March 5th to Abergavenny, and the subsequent dates and runs are as follows:—April 9th, to Rhayader; May 3rd, Dinmore Hill, upon which run a hill climb for motor cycles is to be held; May 23rd, to British Camp, Malvern, to meet the Gloucestershire A.C.; June 4th, Gloucester; June 18th, Chepstow, to meet the South Wales and the Gloucestershire A.C.'s; July 2nd, Brecon; August 6th, Ludlow; September 3rd, Worcester.

Hertfordshire Automobile Club. — On Saturday, March 26th, this club will hold their opening run of the season, starting from St. Peter's Street, St. Albans, at 2.30 p.m., the route taken being to Hatfield, Hertford, and Stevenage.

The opposition of the club to the imposition of the 10-mile limit, sought to be enforced by the Corporation of St. Albans, is receiving considerable support from several influential tradesmen and residents who have forwarded objections to the Local Government Board and the Town Clerk. It is thoroughly appreciated in the town that if the application is granted it will lead to a great deal of money which at present finds its way into St. Albans from motorists, being spent elsewhere.

Irish Automobile Club.—Last week the Annual General Meeting of this club was held at the Shelbourne Hotel, Dublin, Mr. W. G. D. Goff, J.P., presiding. Mr. R. J. Mecredy, the Hon. Secretary, presented the report, which was unanimously adopted. The membership, it was stated, now amounted to 118, and the following officials were elected at the meeting for the present year:—President, Right Hon. Sir H. Plunkett: Chairman, W. G. D. Goff; Vice-Chairman, Thomas Talbot Power; Hon. Secretary, Edward White; Hon. Treasurer, Walter Sexton; Committee, Lord Louth, Col. Chaloner Knox, Rev. Hon. B. J. Plunket, Sir Valentine Grace, Dr. J. F. Colohan, Dr. J. H. Glenn; Messrs. R. J. Mecredy, Chas. Wisdom Hely, B. Barrett, F. Hall, G. O'Grady, J. C. Percy, J. H. Murdock, J. O'Connor, Charles Tickell, S. H. Cochrane, F. C. Hayes, F. V. Westby, R. H. P. Wandesford. It has been determined to take premises in Ann's Lane as a garage, it being arranged that after the garage has been opened an entrance fee of £1 1*s*. is to be charged. Votes of thanks were heartily accorded to Mr. R. J. Mecredy, for his services as Honorary Secretary, and to Mr. T. M. Healy, M.P., for his efforts in connection with the introduction of the Motor Car Bill, a final compliment being paid to the Chairman, Mr. Goff, for his work on behalf of the Club and of automobilism generally.

Lincolnshire Automobile Club.—At a meeting of the committee of this club, held at headquarters last week, there were present:—Captain Cole (in the chair), Mr. R. Gleed, Mr. C. Nelson, Mr. G. Lowe, Mr. A. Padley, Captain Newsum, Mr. G. Godson, Mr. W. Jevons, Mr. W. R. Pennell, and Mr. E. Cragg (secretary). The chairman and secretary were instructed to take whatever action was necessary on behalf of the club, and at its expense to oppose the proposal of the Holland County Council to close certain roads, and they were instructed to call on members to assist and give evidence when required, and to call such members of the club as could give expert evidence to assist. A provisional list of fixtures for the ensuing season was drawn up. Dr. Pim (Sleaford) placed his resignation and his seat on the committee at the disposal of the club, so that a gentleman in touch with Boston and neighbourhood might be proposed in his place. The following new members were duly elected:—The Rev. S. W. Skene, Deeping St. James; Mr. J. W. Cross, Stamford; the Hon. Maurice Gifford, Grantham; and the Rev. W. A. H. Thorold, Stainby, near Grantham. The club's annual dinner is to be held at Lincoln on April 16th. Between 150 and 200 gentlemen are expected to attend.

Scottish Automobile Club (Western Section).—On Monday evening, in the Windsor Hotel, Glasgow, Professor Hugh Galt delivered a lecture before this section, the subject being "The Medical Aspect of Motoring." The meeting was presided over by Mr. John Adam, chairman of the section.

Professor Galt, who made his address non-technical and short, said his subject might be viewed from three points of view—its utility to the profession, its profits to the profession, and its effects on health. He proposed to consider it in its last aspect only.

He regretted that his experience as a motorist had been limited. He had, however, been able to observe the exact effects of motoring on himself and on others, and it was the result of these observations which he would submit to the meeting.

It was a well recognised fact that there is a very close connection between the condition of the nervous system and the general health, and any pastime which tended to allay nerve irritation tended to improve health. Cases were then instanced in which death resulted from nervous shock, while nothing in the physical state could account for the collapse.

The general effect of a motor run was to soothe the nerves by a well-defined process. In the first place the excitement caused a quickening of the pulse, the heart's action being accelerated. The result was more frequent breathing, usually in the purest air, and the resulting augmentation of oxygen in the blood. Not only did this benefit the nerves. It is a recognised fact that long residence in the vitiated air of a city introduced poisonous secretions into the system which reacted upon the nerves in producing malaise, headaches, biliousness, a "run down" condition, and such like. A motor car run had the effect of stimulating the kidneys, liver, and to a less extent, the bowels, by which the poisons referred to were released and carried away. This not only affected the physical health, but invigorated the mind also.

Motoring also was a highly-interesting hobby, and the value of a really attractive hobby could not be over-estimated from a health point of view. Monotony was the great evil of many lives, affecting both the mental and physical welfare, and from that depressing state motoring formed an unequalled relief.

The ease by which the open country could be reached, without worry about trains or serious preparation, was a great advantage. Fresh air and fresh scenery, physical and mental benefits could be obtained in the minimum time, and with the minimum of trouble.

Apart from mere bodily health, motoring constituted a valuable training in resource and self-reliance, for nothing he knew of could more thoroughly test a man's character in this respect than a motor car breakdown while miles from anywhere.

Another advantage of motoring was the acclimatisation to changing temperatures, which had the effect of giving immunity from colds and chills. In the matter of excitement a fast motor car ride was as exhilarating as steering a yacht in a choppy sea. The element of danger, though slight, was indispensable, as he did not believe that any game would be appreciated in these islands which did not carry with it some risk.

On the questions of clothing and food, his experience of these subjects was not sufficiently extensive to enable him to give an opinion.

In conclusion, if people were suffering from no severe organic disease, and if they suffered from no grave mental disturbance, motoring in moderation would do good.

Subsequently, in reply to a remark by Dr. Robb, Professor Galt expressed regret that he had inadvertently missed speaking of insomnia. For this terrible trouble motoring was an absolutely certain specific.

A discussion followed, in which, especially on the effect of goggles, the most divergent views were expressed.

The usual votes concluded the proceedings.

Sheffield Automobile Club.—A long distance competition, to take place on September 30th next, is announced by this club. Mr. James Barber has offered a gold medal for the longest non-stop run by any member of the car section, and Mr. J. T. Thompson has made the same offer to members of the cycle section.

A number of fixtures for Thursdays and Saturdays are being arranged for each month. For the motor cycle section during March the runs will be:—On the 10th, Hathersage; 12th, Bawtry; 17th, Wentworth; 19th, Bakewell; 24th, Ashopton; 26th, Retford; 31st, Stoney Middleton. In the car section, on March 26th, the run will be to Retford.

THE Reading Automobile Club, the Oxford and District Club, the Sheffield Club, and the Eastern Counties Club, have joined the Motor Union under Scheme 2, at an affiliation fee of 5*s.* per member per annum.

Motor Volunteer Corps.—The undermentioned gentlemen have been enrolled as members:—Messrs. J. Whittaker, T. W. Kemp, F. Haden-Morris, F. S. H. Dyer-Bennet, J. M. Inglis, H. M. Watson.

DUTY.—Mr. J. Rochford was employed under the General Officer Commanding the Eastern District on a Staff ride in the vicinity of Stowmarket from the 22nd to 25th ult.

The officers of the Royal Artillery were engaged on a Staff ride in the vicinity of Sevenoaks from the 1st to 3rd March, when the undernamed officers and members were employed, which, in spite of the very bad weather and roads, was successfully carried out. The Officer Commanding the Royal Artillery District has written expressing his gratification with the way in which the members of the corps performed their duty:—Capts. H. V. C. Ker-Seymer and E. Midgley, Lieut. the Hon. A. V. Verney-Cave, Members W. A. Ellington and F. Smythies.

Mr. H. Dixon drove the General Officer Commanding the Southern District from Portsmouth to Droxford and East Meon on the 25th ult. for the purpose of inspecting the proposed camping ground for the Yeomanry.

The War Office has decided that the driving certificate of the Automobile Club of Great Britain and Ireland, countersigned by the Officer Commanding the corps, shall be accepted as the qualification for the proficiency grant for officers.

The undernamed officers of the corps were presented to His Majesty the King at the Levée held at St. James's Palace on the 29th ult. Owing to the fact that the full dress uniform has not yet been approved, His Majesty graciously sanctioned their being presented in "Field Service Dress":—Lieut.-Col. M. Mayhew, Majors H. H. Forbes Eden, N. H. Balfour, J. M. Benett-Stanford, Capts. the Hon. C. S. Rolls, J. E. Hammond, T. E. Polden, W. J. Crampton, A. B. Hearn, H. V. C. Ker-Seymer, W. G. D. Goff, E. Midgley, Lieuts. H. F. Trippel, J. A. Holder, the Hon. A. Verney-Cave, O. H. Bayldon, F. R. S. Bircham, J. F. Ochs, H. Welch-Thornton, M. J. Tuchmann, P. W. Northey.

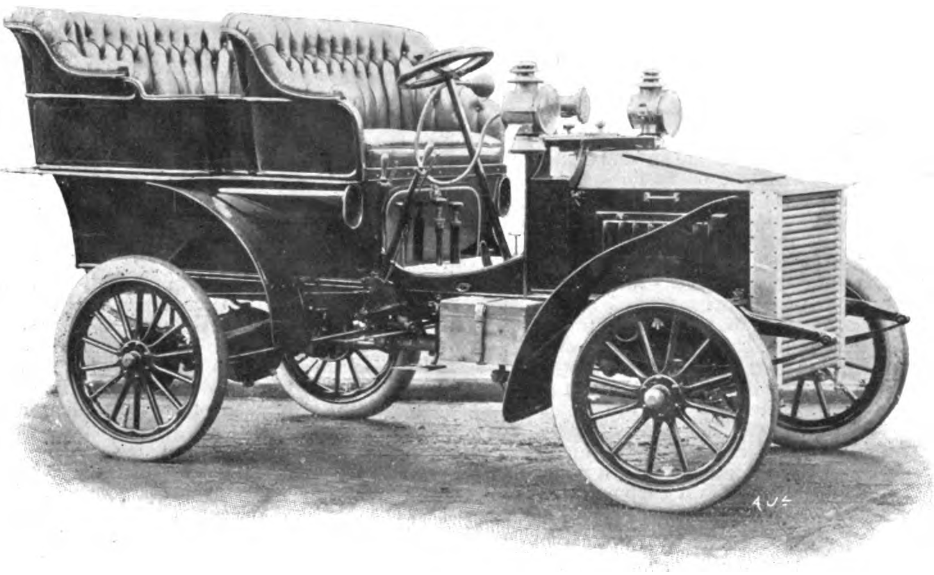
Manchester Motor Show.—Automobile interests have advanced in such a remarkable manner in the Midlands that it has been found necessary this year to separate the motor car section of the annual show of the Manchester and District Cycle Trades' Association entirely from the ordinary cycle show. The motorless machines had their turn a short time back, and on Monday last the automobiles had full possession of the fine St. James' Hall in Manchester, where a fully representative exhibition of all the leading makes, both foreign and indigenous, had been got together. The whole of the entrance hall was occupied by a fine stand of Messrs. Jarrott and Letts, on which the Crossley chassis, the Oldsmobile, and the De Dietrich cars found considerable prominence. Besides the Crossley make other local manufacturers had imposing stands. The Belsize Motor Car and Engineering Company, of Clayton, and Messrs. Horsfall and Bickham, of Pendleton, showed their well-known Belsize models and the cars now known as the "Horbick" respectively. The Eclipse Machine Company (Messrs. Rothwell), of Oldham, also exhibited some interesting cars and motor cycles, Messrs. Bradbury and Co., another Oldham firm, making a strong feature of their Bradbury motor fore-car and of their 4-h.p. Peerless motor. Messrs. Humber, Ltd., were well represented with their Coventry Humberette and light cars, and Messrs. McNeil, Hutchison and Borthwick, in addition to the Cottereau vehicles, had prominently exhibited specimens of the See band tyre. The Bolton Motor Company had a fine specimen of a touring Wolseley car, Messrs. Bennett and Carlisle, of Deansgate, Manchester, Messrs. Newton and Co., of King Street West, and Messrs. J. Cockshott and Co., of Deansgate, staging a variety of makes for which they are agents in the district, the latter also making a speciality of the Talbot cars. The Shrewsbury and Challiner Tyre Company, of Ardwick, Manchester, in addition to the latest models of their well-known tyres, attracted considerable attention with their patent interlocking artillery wheels.

The formal opening of the Exhibition was undertaken by the Earl of Shrewsbury and Talbot, the Lord Mayor of Manchester taking part in the ceremony supported by the ex-Mayor of Salford. Mr. Rudman, in describing a 70-mile run that he had enjoyed recently on a motor car, said that "it was like sitting on a sofa and being carried through space with a glass (the wind screen) in front of you." Lord Shrewsbury, in his speech at the opening ceremony, after congratulating the organisers on the splendid exhibition they had got together and the immense strides which the motor car industry had made within the last three or four years, said that he did not agree that the extended employment of motors in towns would clash with the interests of the British agriculturists, because he thought the general utility horse at present was fed mainly on foreign oats and bedded with peat moss.

REVIEWS OF BOOKS.

O'Gorman's Motor Pocket Book. (Constable and Co., 7*s.* 6*d.*)

Mr. M. J. O'Gorman has written a "Motor Pocket Book" which is a handy little volume bound in red Russian leather, dealing alphabetically with all manner of things of interest to the motorist, and really wonderfully comprehensive in its information, though the volume is, like nearly all pocket books, slightly too big for the pockets of the ordinary citizen. The result is to produce a sort of combined glossary and dictionary, which is at times instructive and at times amusing, though it is by no means always up to the same level. Mr. O'Gorman has always posed as the possessor of a very pretty wit, and he plays off quite a number of jokes on the unsuspecting reader. Without any warning whatever, after a serious disquisition on some accessory or automobile topic, he introduces an elaborate joke, and one cannot always tell, at first, whether it is a joke or not. Mark Twain frequently announced that his humorous passages were intended to be funny. Had Mr. O'Gorman followed his example it would certainly have diminished the mystification of his readers. Thus, under the heading of "mathematical treatment," we have, without any indication that it is not meant seriously, Mr. Moffat Ford's old joke, which we published about a year ago, about $pc + lsd = (pc)^2$ given *in extenso*, and there are various other similar things of the kind. There are many inaccuracies in the work, particularly in the French and German equivalents, which are often enough to astonish the intelligent foreigner. A Frenchman who was informed that "oleonaphte" was the ordinary term for petroleum, would probably have a paroxysm, while "throttle" is certainly not "Reglage." If somebody really competent would compile a French, German, and English automobile dictionary, he would deserve well of mankind, but the difficulties are enormous, for the phraseology is in the making. Even in matters of everyday knowledge, Mr. O'Gorman is inaccurate. Thus he gives the price of The Automotor Journal at 6*d.* instead of 3*d.*, and is not apparently aware of its curtailment of title, both of which changes took effect in April, 1902.



The Latest Type of White Steam Car, with Specially-Designed Tonneau Body, being introduced for 1904.

"The Little Guides." Suffolk. By W. A. Dutt. (Methuen and Co., 3*s.*). London: Methuen and Co.

This little guide is uniform with the others of the series which we have previously reviewed, but is in some ways superior to most of them. It is rather better illustrated, and is fuller of detailed information. It is surprising on perusing this work how much of the history of England appears to be concentrated in Suffolk, and the number of places of antiquarian interest in the county which are within reach of the London automobilist. The county is, of course, bound up with some of the great names of English history. There is the great Blount family, the Bacon family, the Berners family, and many others, but above all Suffolk was the county of Borrow, and he was born on Oulton Broad, so that one feels some regret that the writer of the present guide did not see his way to a more adequate notice of this eccentric genius, while it is quite astonishing that Borrow's name should be omitted from the short list of celebrated Suffolk men and women. Historically, too, there are some strange omissions, but on the whole the work is well up to the level of the other members of the series, is attractively written, and provides a quantity of interesting detailed information that cannot fail to be of value to automobilist and other tourists.

"The Grant and Validity of British Patents," by James Roberts, Barrister-at-Law, of the Inner Temple, &c. London: James Murray and Co.

It is not often that the reviewer has practically nothing but praise for a work he is called upon to notice, and heartily glad is he when such occasions arise, whatever cynics may say to the contrary. Mr. Roberts's book on patent law is an occasion of the sort. From first to last it is a thoroughly admirable treatise. It is not concerned with the whole enormous subject of patent law. Mr. Roberts wisely confines it to what is set forth in his title.

Thus he deals with the general questions of what constitute subject matter and novelty in patents and the procedure for obtaining them, involving, of course, the practice before the Comptroller and the Law Officer in cases of opposition and amendments of patents. The treatment of opposition and amendment is more exhaustive, more thoroughly lucid, and better illustrated by typical cases that have been decided, than in the case of any treatise on patent law that we have yet come across. Mr. Roberts does not deal in any way with the subject of actions for infringement, actions for revocation, actions for restraining threats, or the whole wide subject of patent conveyancing, including assignments, licences, agreements, and all the rest of it. The student who desires information on these points will have to consult some of the other standard works. But on the ground which he does cover, Mr. Roberts is singularly lucid, convincing, and compendious.

Only a few really leading cases, such as Parkinson *v* Simon and Deeley *v.* Perks, are omitted from this collection, though they are referred to in the body of the work. It seems a pity that this elaborate and valuable table of cases should be merely arranged in chronological order year by year. Unless one knows the cases almost by heart it is a terrible job to find the case one wants except through the index, and there there are a lot of cross references. From the automobilists' point of view it is rather a pity that none of the automobile patent cases are given. It is true that lawyers do not look upon cases as forming precedents unless they go at least to the Court of Appeal, and that none of these have done this, but we should certainly like to have seen for all that some reference to such a case as the British Motor Traction Company *v.* Friswell. The work concludes with the Patent Acts and the recent Patent Rules of 1903.

During the recent floods at Maidenhead, the main roads were at times quite impassable. Wherever a horse-vehicle could travel it was often demonstrated that motor cars were able to get through. The scene of the above picture is in Bridge Street, Maidenhead, where the disturbance of the water caused by the horse is seen to be in striking contrast with the smooth movement of the motor car in the rear.

A feature of the work is the very elaborate excerpts of decided cases which fill nearly half the volume. These are apparently compiled from the Patent Office reports, giving in nearly all cases careful summaries of the patents themselves (frequently well illustrated), summaries of the decisions in the different courts, and general excerpts from the judgments delivered by the Courts of Appeal or the judges in the House of Lords. These cases are brought exceptionally well up-to-date, and we find amongst them such recent leading cases as Dredge *v.* Parnell, the Electric Construction Corporation *v.* the Birmingham Tramways Company, Tubes *v.* The Perfecta Tube Company, and Chamberlain and Hookham *v.* The Mayor and Corporation of Bradford. Mr. Roberts is evidently an electrician, and has given special care and attention to the electrical cases. Altogether this part of the book forms a work of reference which will go a long way to replace in ordinary practice the Patent Office reports, as the leading points in each case are given and the collection of cases is singularly representative.

"Who's Who for 1904." London: Adam and Charles Black, Soho Square. (7*s.* 6*d.*)

THIS well-known volume grows every year more comprehensive, and this year has progressed on the same scale as formerly. It is satisfactory to notice from its pages that automobilism is being more regularly entered among the leading pursuits of the principal members of society.

"Who's Who Year Book for 1904." London: Adam and Charles Black. (1*s.*)

THE short tables, including members of the Houses of Parliament, the Bench of Bishops, the various clubs, Privy Council, list of counsel and judges, and the leading journals and newspapers in the country, which was formerly published in "Who's Who" itself, is this year brought out separately in a handy volume, and, taken in conjunction with the larger and more important work, it is invaluable for purposes of reference.

The Automotor Journal stand will be No. 142, in its old position, at Messrs. Cordingley and Co.'s Motor Exhibition at the Agricultural Hall, opening on Saturday, March 19th, and closing on March 26th.

Next Saturday, March 19th, the Automobile Exhibition at the Agricultural Hall will be formally opened to the public, remaining open up to and including the following Saturday, March 26th. No less than 317 exhibitors have booked spaces, and every effort is being made by the organisers to ensure that the whole of the exhibits are in a complete state, ready for the opening morning. With the promise of slightly better weather, which has been experienced during the last few days, there is little doubt that a great impetus should be given to automobile business with the advent of this Show. Some interesting social events have been arranged during the week, including a dinner by the A.C.G.B.I., a reception by the Ladies' Automobile Club, and the annual meeting of the Motor Union. Berners Hall will be utilised for the first time as part of the Motor Car Exhibition, whilst in addition, in the Minor Hall, a speciality has been made for the display of heavy vehicles. New inventions will mainly occupy King Edward's Hall, and a very large amount of interest will, without question, be centred in the airship and balloon section, which is in the hands of the Aero Club, assisted, we understand, by the War Office. Both 40-h.p. and 60-h.p. Mercedes chassis and a Hotchkiss chassis will be on view, whilst as a special attraction the new Hutton chassis is promised to be staged.

Last week by a very annoying mistake in the advertisement department of our Journal, old "copy," in connection with Messrs. Cordingley and Co.'s exhibition, was inserted in our advertisement columns instead of the fresh copy which should have appeared. We regret the mistake greatly, as in the copy published an announcement appeared stating that there was still some space vacant. This, we understand, is not the case, and that practically every available foot in the building has for some time been allotted. We regret the error the more as the new matter, and the form in which it was given, was distinctly original and striking, as will be seen by the selection which we reproduce below of what should have actually appeared.

WAIT . . .
Until March 26th, 1904,
and see what
business is done at the
Automobile Club Show.

Agricultural Hall, London,
March 19-26, 1904.

WAIT . . .
Before signing away
your Freedom—and
restricting your business.

OUR date is the right
one, the venue the
largest and most convenient,
and the attendance
WE GUARANTEE.

Lieut. Henry Norman, M.P., of the Motor Volunteer Corps has, it is officially notified, resigned his commission.

The Cycle Engineers Institute have determined that for the future their title shall be "The Automobile and Cycle Engineers Institute.

A motor car workshop is shortly to be installed at the new Technical Institute which the London County Council have established in Saltram Crescent, Paddington.

The King's new 28-h.p. Mercedes motor car is now completed, and has been delivered at Buckingham Palace. In all probability it will be mainly used by His Majesty during his visit to Ireland.

Before the Rugby Engineering Society last week Mr. R. Hobbs read an extremely interesting paper, selecting as his subject "Notes on Automobiles." Mr. Hobbs was inclined to regard the petrol-electric combination as the most satisfactory system for propelling heavy service vehicles where change-speed gears have proved unsatisfactory under the strains they undergo in stopping and restarting. Another subject on which Mr. Hobbs touched was electric ignition, the main feature of the lecture relating to details in connection with petrol cars.

A Continental Easter Motor Cycle Tour is being arranged by the C.T.C., and every effort is being made by the committee to render the trip thoroughly enjoyable. The tour will extend from March 30th to April 6th, the party crossing from Southampton to Havre on the night of the 30th, returning from France by the night steamer on April 5th. The chief places to be visited will include Trouville, Caen, St. Lô, Coutances, Granville, Avranches, Mont Saint Michel, Mortain, Domfront, Ecouché, Falaise, Lisieux, Brionne, Bourgthéroulde, Rouen, and Caudebec.

It is worthy of notice that, in Guernsey, in the course of three years, only one motorist has been prosecuted under the local ordinance, and this occurred a few days ago. He was not a resident but a visitor from Liverpool, and was summoned for carrying no light after dark. He failed to put in an appearance, and was fined 4*s.* 2*d.* and costs. This summer the motorist visitor will find a modest garage and repair shop fairly well equipped in Guernsey. A local tradesman has purchased premises and is fitting them accordingly. Among recent importations of motor cars may be mentioned a roomy tonneau, the property of his Excellency the Lieut.-Governor, and a voiturette, with hood, which Dr. Benson, who has disposed of his horses, now uses in connection with his medical practice.

Lord Hastings during the recent Crystal Palace Exhibition acquired the 28-h.p. Gladiator car, which was exhibited on S. F. Edge Limited's stand, Mr. Henry A. Campbell, of Lynford Hall, securing a 14-h.p. car with a similar type of body, a feature of which is its roominess and side entrances.

We have heard of the "Clipper of the Clouds" in fiction, now Mr. Percival Spencer informs us that his brother is to style himself "Admiral" of their balloons. "The Sky Admiral" ought to make an excellent title for an up-to-date work of fiction.

The 1904 Talbot cars are now reported as ready for delivery, both by the British Automobile Commercial Syndicate in London and their agents, Messrs. Hollingdrake and Sons for Lancashire, Messrs. H. E. Hall and Co., of Tonbridge, and Mr. C. B Wooton, of Thornton Heath. The B.A.C. Syndicate hope to be able to deliver fully 100 cars during the present month.

The German Emperor, who has recently ordered a new car to be built for his use, has had the body work built for him by the English firm of Messrs. Hooper. The upholstery and outside of the vehicle, which is of the omnibus type, will be in the German Imperial colours, ivory white with dark blue and gold. The chassis of the vehicle is being built by the Canstatt Daimler people, and will be on the Mercedes model.

A paper was read by Mr. G. C. Allingham at the Junior Institution of Engineers on Friday, the 4th inst., on "The Accumulator Question in Reference to Automobilism." Mr. Allingham dealt generally with the leading features of ignition and other batteries, and the methods of charging them and keeping them in proper condition, and incidentally pointed out that the reason why no secondary batteries with so-called solid electrolyte were satisfactory was due to the impedence to the circulation of the electrolyte which resulted from the employment of the solid or semi-solid material.

A new process of welding aluminium, which may prove of use to automobile manufacturers, has been brought out by Mr. Cowper-Coles, the well-known electro-metallurgist. It is amazing in its simplicity. The joints of aluminium which are to be welded are simply heated by an ordinary benzine lamp, and brought together under suitable pressure, when the melted portion of the aluminium squeezes out, carrying with it the layer of oxide, which would prevent proper adherence, and the latter then forms a ring on the outside of the weld. The weld is immediately quenched, and is said to be as strong as any other part of the metal.

Mr. Windsor T. White, President of the White Sewing Machine Company, of Cleveland (manufacturers of the White Steam Car), and Vice-President of the National Association of Automobile Manufacturers of America, has been elected President of the Association. In view of the conflicting interests likely to arise in connection with the Selden patents in America, the selection is a wise one, as Mr. White's company manipulates a type of car in which the Selden patent is not involved, and is therefore free altogether from bias. Mr. White's well-known business ability should prove of immense service to his fellow manufacturers.

An Artistic French Postcard, showing the various Crowned Heads who have patronised the Sport of Automobilism.

Lord Stanley and others have given a testimonial to the wonderful speed attainable by the automobile when engaged in the service of the Crown at manœuvres, and there is not the slightest doubt that it is destined to afford, in future, the most valuable assistance to military commanders. Nevertheless, the intelligence that Boris Sarafoff, the leader of the insurrectionary movement in Macedonia, has ordered a light and strong motor car to be ready for him to insurrect upon by the time "the snows melt in the Balkans," has distinct suggestions of comic opera. No doubt he is a military leader and has extensive forces under his command, and doubtless the car will be of the greatest use to him; but the notion of a country in which revolutionary movements can be carried on so openly that their leaders can arrange months beforehand to be supplied with conveniences of this sort, suggests a systematic toleration of revolution by the authorities that borders on the farcical. It reminds one of the advertisement in *Punch* that included "good landlord shooting" amid the many attractions of an Irish estate which was in the market.

We are glad to find that a large firm of motor car agents who have been airing their views in one of the daily papers through the recognised channel of an "interview," admit that English manufacturers are now able to supply quite as good a chassis as can be obtained from France, and at an equally reasonable price. When, however, the same firm go on to inform us that British body-builders are far behind their French rivals in price, elegance of appearance, and general excellence, we would make bold to point out that the statement itself is considerably behind the times. It might have passed muster a year or more ago. But one of the most salient features of motor car progress in these Islands, during the past year, has been the awakening of the carriage builder to the possibilities of automobiles, with, as a consequence, enormous improvement in body-work. As we pointed out in reference to the Crystal Palace exhibition, the best British body-work is now fully equal to that of French builders, and it is not, quality for quality, more expensive. The firm we refer to point out that the weak point with English manufacturers is, that they are slow and but too often not up to time. This is alas, largely true of all manufacturers in any country, not merely of automobile builders. But in that respect also there is improvement.

To secure orders for 4,500 cars at one Exhibition sounds indeed like a record. This is, however, the number of Oldsmobile cars sold, we understand, at the recent New York Exhibition, one order alone being for 650 of these little runabouts.

The Austrian Ministry of the Interior proposes to introduce compulsory numbering for automobiles, and has been discussing the question with some leading members of the Austrian Automobile Club. The proposals at present put forward resemble those already adopted in this country.

Messrs. Deasy and Co., owing to the increase of their business, are very shortly moving their premises from 217, Piccadilly to 10, Brompton Road, close to Tattersall's, Albert Gate, where larger and more commodious premises have been secured. The new premises will allow sufficient room for carrying on repairs under their personal supervision. They will also keep a large stock of the various parts which may be required for the Martini car.

We have received from Messrs. F.I.A.T. Motors, Limited, of 37, Long Acre, W.C., who are the sole and exclusive concessionaires in Great Britain and Ireland for the importation of the F.I.A.T. cars, a notification that Messrs. the Fabbrica Italiana di Automobili, Torino, the makers of this car, are anxious to have it known in the United Kingdom, that they can take no responsibility for orders for these cars which are not placed through their British representatives, the F.I.A.T. Motors, Limited, or agents licensed by that firm.

An up-to-date garage is to be opened by the Medway Motor and Engineering Company, Limited, at 77, High Street, Chatham, on the 25th instant. Mr. E. Middlemiss, the Managing Director, informs us that there will be every modern appliance for repairs and accumulator charging, and that the company will hold a full stock of motor oil, petrol and accessories. Following the custom in several other districts the garage will be open for repairs and supplies day and night.

The exclusive agency for C.G.V. cars, the productions of Messrs. Charron, Girardot, and Voigt, has been secured, we understand, by the London Motor Garage Company, of 33-37, Wardour Street, W. The London Motor Garage Company are now in a position to deliver from stock 15 and 25-h.p. cars of this make, which has during the past two years made such successful showing at the Paris Exhibition and during the recent British Reliability Trial. Mr. Chas. Joiner, who has hitherto been connected with Messrs. Charron's works and sales department, has been appointed manager of the London Motor Garage Company's business, where he will be personally at the disposal of the Company's clients. Besides making a special feature of the C.G.V. cars, the Company also advise us that they have just received a consignment of Mercedes Simplex cars, including one of the latest 60-h.p. models, whilst Pipe cars of 12, 15, and 20-h.p. will be, as heretofore, entirely in the hands of the Company for Great Britain. Three of this latter make of car are the only vehicles entered to represent Belgium in the race for the Gordon Bennett Cup this year.

A complete charging plant has recently been installed by the Motor Mart, Limited, at their works and showrooms, 108, Euston Road, N.W. This plant is utilised not only for charging electric vehicles, but in addition, is sufficiently extensive to illuminate the whole of the premises.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Automobile Publishing and General Agency, Limited.—Capital, £1,000 in £1 shares. Object, to acquire from the Institute of Physical and Political Geography, Limited, of 11, Poultry, Cheapside, E.C., all their interest in the motor maps now in course of publication by them, &c. E. A. Mackenzie is the first director.

Engine Syndicate, Limited.—Capital, £200 in 1*s*. shares. Object, to carry on the business of manufacturers of and dealers in rotary engines, motor car machinery, &c.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published March 10th, 1904.

24,965. J. Parsons and others. Clutch and brake mechanism.

Applied for in 1903.

Published March 10th, 1904.

3,409. A. Craig. Motor cars.
5,126. C. J. D. Oppermann and others. Speed-changing gear.
5,615. R. Nielson-Stroyer. Explosion engine with separate combustion chamber.
6,140. W. W. G. Webb. Electric ignition apparatus.
7,535. Wolseley Tool and Motor Company and H. Austin. Air and liquid fuel regulator.
7,610. C. Clayton. Cone clutches for motor cycles.
8,473. R. S. Lovelace. Internal combustion engines.
8,474. R. S. Lovelace. Electric ignition devices.
8,841. L. A. Merkt. Mixing valves.
12,011. P. Murray and others. Explosion engines.
16,238. W. Montgomery. Convertible cycles and motor cycles.
22,733. H. Rippon-Seymour. Anti-vibratory spring fork and frame for motor cycles.
23,240. T. A. Silverwood. Wheels.
27,576. W. Roos Magneto-electric ignition apparatus.
28,812. O. C. Durvea and M. C. White. High compression gas or vapour engines.

Published March 17th, 1904.

1,546. A. F. Hawksley. Wheels.
4,757. J. Cottrell and A. H. Smith. Racing track for velocipedes and automotors.
5,011. C. T. Mason and S. R. Brown. Electric switch for motor cycles.
6,453. V. H. Gregory. Engine valve gear of two-cycle explosion engines.
8,510. C. B. Mills and A. Williams. Self-propelled vehicles.
9,032. P. G. Tacchi. Explosion engines.
9,243. M. Eyquem. Wheel tyres.
9,373. W. D. Sainsbury. Skid preventing devices.
14,819. F. Reichenbach. Internal combustion engines.
15,391. J. Bartlett. Acetylene and other lamps.
15,960. L. S. Van Westrum. Method of prevention of dust.
19,626. A. Altmann. Regulating or governing devices.
27,176. W. A. Stoddard. Motor bicycles.
27,574. A. C. N. Foster. Brush and commutator.

Applied for in 1904.

Published March 10th, 1904.

686. C. Suckro. Wheels for cycles and motor cars.
1,187. C. P. Elieson. Electric accumulator plate.
1,207. W. P. Simpson. Combined motor lawn mowers and rollers.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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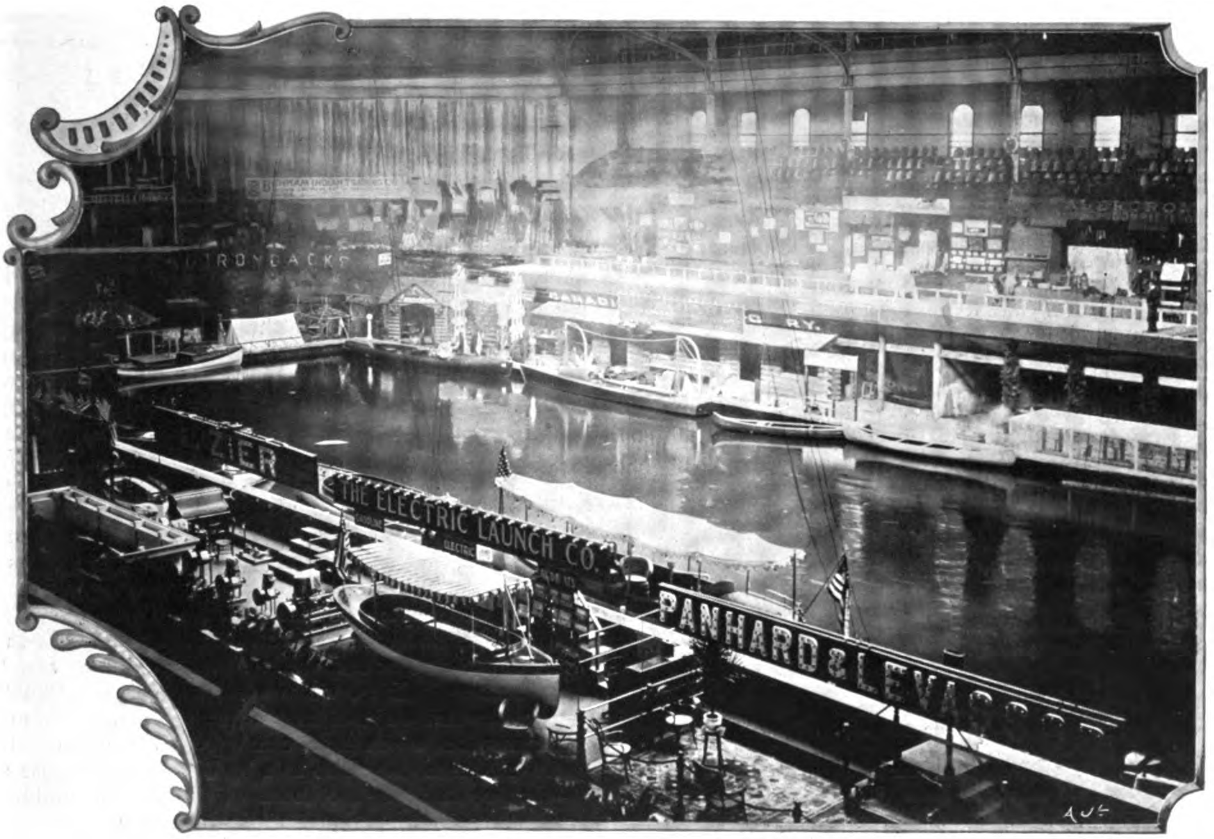

MOTOR BOATS AT THE SPORTSMAN'S EXHIBITION HELD RECENTLY AT MADDISON SQUARE GARDENS, NEW YORK.—We referred to this unique show last week, and ventured to hope that something of the same sort might be organised in London for 1905. The size of the temporary tank in the centre can be gauged by the number of craft moored to the sides. The introduction of the motor boat element this year enormously increased the interest in the Sportsman's Exhibition, quite overshadowing all other forms of sport represented.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Mar. 19–26	Cordingley and Co.'s Motor Car Exhibition at the Agricultural Hall.
*Mar. 24	Alcohol as a Motive Power, by Dr. W. R. Ormandy.
Mar. 25–30	*Side-Slip Trials. (Entries close Feb. 29.)
Apl. 16	Examination of Cars for Gordon-Bennett British Eliminating Trials.
May	British Gordon-Bennett Race Eliminating Trials.
May 19–20	Glasgow-London Non-Stop Run.
June 1–7	Motor Bicycle Endurance Trial.
June 11	Automobile Races, Ranelagh Club.
July 30	British International Cup for Motor Boats.
August	Reliability Trials for Motor Boats.
Sept. ...	*Reliability Trials.
Oct.–Nov.	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Mar. ...	Paris-Rome (*La France Automobile*).
Mar. 13–20	Cannes Automobile Week.
Mar. 19–27	Frankfort Exhibition.
Mar. 20–29	Nice Week (details, Oct. 31, p. 1168).
Mar. 21–26	Washington (U.S.A.) Auto Show.
Apl. 4–9	A.C. America Commercial Vehicle Trials.
Apl. 5–15	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17	Coupe Meyan (Motor Boats).
Apl. 18–23	Paris-Nice-Rome.
Apl. 30–May 12	Antwerp Salon.
May. 1	Carburettor Trials (A. C. de France).
May 8...	Exelberg Hill Climb (A.C. Austria).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20	French Gordon-Bennett Race Eliminating Trials.
May ...	Guadarrama Hill Climb (A.C. Spain).
May 8–12	A.C. Bordelais Automobile Week.
May 11–15	Milan Exhibition and Tourist Trial.
May 12	Perigueux Hill Climb (A.C. Dordogne).
May 12–15	Tours Tourist Trial.
May 14–15	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16–23	Circuit National Belge.
May 23–31	Aix-les-Bains Week.
June ...	Dourdan Kilom. Trials (*L'Auto*).
June 7	Namur Week.
June 17	Gordon-Bennett Race.
July 10	Mont-Cenis Hill Climb (A.C. Italy).
July ..	Speed Trials (*L'Auto*).
July 16–17	Ostende Motor Boat Races.
July 17	Antwerp–Ostende Motor Boat Run.
July 18–23	Ostende Week.
July 22	Kiel Motor Boat Races.
July 23-25	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11	Paris–Deauville Motor Boat Race.
Aug. 12	Motor Boat Race for Gaston Menier Cup.
Aug. 13-14	Calais-Dover-Calais (motor boats).
Aug. 15	Calais-Boulogne-Calais (motor boats).
Aug. 22-Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28	Ventoux Hill Climb (Avignon).
Sept. ...	Deauville Automobile Meeting (*L'Auto*).
Sept. 2	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22	Leipzig Cycle and Motor Show.
Nov. 20	100 Kiloms. Trial (A.C. Algeria).
Dec. ...	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Club Reformers' Victory.

The forces of reform have secured an epoch-making victory, both in the election of the committee for the Automobile Club and in regard to the various motions on the agenda paper, on which the opinion of the club as a body was taken at the memorable meeting on Thursday in last week. The reform party headed, and we might say generaled, by Mr Scott Montagu, were successful in securing seats on the committee for 49 out of the 50 members whom they had nominated, and even the one exception, Mr. Leonard, was no supporter of the old *régime*, but an independent member who had already expressed his full and complete sympathy with the aims and objects of the reform party, was originally included in their list, and only removed from it because he desired to retain the right of full and complete independence of action. Everyone who has the future progress of the automobile movement at heart, whether they be members of the club or not, will be gratified at the result of the election. It is, we venture to believe, a practical guarantee that we shall have no repetition of the blunders and mistakes which have characterised the proceedings of the Automobile Club as a body during the past year—that we shall see no more of the clumsy diplomacy and short-sighted action—of the bickerings and controversies between parties and sections—which have been rapidly reducing the Automobile Club to a secondary position, and have diminished its influence with public bodies, and its prestige in the eyes of the general public. Of course, there will be heart-burnings, and we must admit that several members whose names we should all have been but too glad to see on the committee have not been elected. This, however, was largely their own fault. They were approached by the Reform Committee, but preferred to be nominated by the retiring club committee. The members who were in favour of the reform party had consequently no choice in the matter. If the new committee act in accordance with the views they have expressed to their nominators, and we have every reason to believe they will do so, we may look forward to finding the club almost immediately reinstated in its former influential position as a result of the election. This will, we sincerely believe, result, not only from the personnel of the newly-elected committee, but from one of its most important consequences, viz., that we shall witness the important offices of president and two of the vice-chairmanships being filled by public men of such undoubted integrity as the Duke of Sutherland; the Lord Lieutenant of Ireland, Lord Dudley; and the Postmaster-General, Lord Stanley. With the leading positions in the club held by noblemen of such position and of so high standing in the estimation of the legislative of the United Kingdom, backed up by an independent and representative committee, the Automobile Club will be able to command a degree of deference in Government circles, an amount of respect on the part of public bodies, and a degree of consideration from the general public which cannot fail, when the legislative question again comes before Parliament, to produce the most satisfactory results. The effect of the revolution will be equally important in all negotiations which the club may have to conduct with local administrative bodies.

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Recognition of the Trade.

WE cannot dismiss the subject of the general meeting of the club without expressing our satisfaction that such of the motions on the agenda paper as were carried were in full accordance with the victory of the reforming party at the poll. And we would observe in passing, that both the voting at the meeting and the poll for the committee have given conclusive proof that the majority of the members of the club are fully alive to the great interests of the movement, and that the errors of the immediate past, which we and other journals have felt called upon to criticise, though committed in the name of the club, have certainly not been committed with the consent of most of its members. The attempt to exclude members of the trade from the committee proved a signal failure, Mr. Jarrott's motion, which was a direct negative of Lord Shrewsbury's proposal to exclude them, being carried by an overwhelming majority. The Automobile Club is too frequently called upon to adopt a policy and decide questions for which expert knowledge is indispensable for its committee to consist merely of an assembly of *dilettantés*, while the danger of any particular trade interests being accorded undue prominence is best guarded against by allowing full representation to a variety of trade interests. This prevents anything in the way of undue influence being brought to bear by tactics of the nature of "lobbying," to which a committee of amateurs would be but too liable. For the present, at any rate, the members of the club are to be congratulated on having decided to give full and adequate representation to the trading and manufacturing elements on their committee.

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The Legitimate Influence of the Press.

As regards the other resolutions, we are glad to be able to chronicle that the club has decided that being in receipt of pecuniary recompense for services rendered should form a bar to the acceptance of posts of honour in its body, and that other resolutions, directed against the occupancy of seats on the committee by representatives of the automobile Press, and against the discussion of club affairs in the Press, with which the name of Mr. Swinton was associated, were rejected by large majorities. The first of these decisions brings the administration of the club into line with that of all similar bodies in this country, and into accord with the salutary traditions of English club life, and, we might add, the general practice of municipal and even parish local bodies. As regards the question of discussion in the Press, we have pointed out before, and would again observe, that the proceedings of the Automobile Club, as the most important body representing the automobile movement, are matters of public concern, and it is of the utmost importance that they should receive full, free, and unfettered discussion in the columns of the Press. The strongest possible argument in favour of this contention is afforded by the election and general meeting which have just been brought to such a satisfactory conclusion. The triumphant conclusion of the reform campaign is, therefore, to a great extent the work of the Press, and the fact that the automobile and general Press has, at a critical period of the industry and the club, assisted in bringing about so important a reform, is the best answer to critics of the course which we have adopted on this important question. To criticisms of this nature, which generally included the ascription of interested motives, we have refrained from making any reply. Such critics have now received their reply, and we see our triumphant vindication in the result of the elections and the resolutions adopted at the general meeting of the Automobile Club.

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Further Regulations of the Local Government Board.

THE Local Government Board, who have been invariably solicitous of the welfare of the automobile movement, have now promulgated, as they had promised at an early date to do, further regulations in regard to motor vehicles, which embody most of the suggestions made by the Society of Motor Manufacturers and other interested bodies. The regulations are accompanied by an explanatory circular similar to those issued with their previous regulations, and directed to county and borough councils and the other local authorities under the Act who will be concerned with its administration. The L.G.B. have not as yet dealt with an increased tare weight of vehicles which are for the present to be regarded as motor cars, as the question of increasing the weight under Section 12 of the Act of 1903 is under investigation by a Departmental Committee. We may, therefore, anticipate that in this respect the Board will afford the users of heavy vehicles relief at an early date, and in the meantime it is to be hoped the "authorities" will, as heretofore, be fairly generous in their treatment of the tare limit. What relief the L.G.B. could afford, without increasing the weight limit, they have done in the present regulations (which we print in another column) by enlarging the limiting width of motor vehicles from the former 6 ft. 6 ins. to 7 ft. 2 ins. This, it will be at once recognised, is a most important concession, and will be fully appreciated by the users and manufacturers of steam and other lurries, as the former width of 6 ft. 6 ins. was too narrow for the satisfactory construction of vehicles of this kind and was in practice very frequently exceeded. The question of the relationship between the width of the tyre and the weight of the automobile to which it is attached, has been treated as in the former ordinance under the Act of 1896, no doubt because the Board has decided to leave this matter in abeyance until they are in a position to issue the promised revision of the tare weight regulations. As before, these regulations do not apply to tyres of yielding or elastic material, and will not, therefore, affect car owners who employ solid rubber or pneumatic tyres.

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The L.G.B., although fully alive to the nuisance caused to road users—amongst whom, it must be remembered, are motor car drivers as well as others—by the use of excessively dazzling and powerful lights, have not seen their way at present to a satisfactory regulation on the subject. Curiously, however, they prohibit the use of lamps as "searchlights," one of the sub-sections ordaining that every lamp carried by a motor car shall be so constructed as to prevent its use as a searchlight. It is possible the L.G.B. have in view the enormously powerful acetylene lamps which are used for throwing a beam of light along the road far in advance of the car, and, as we have frequently pointed out the dangers attending the misuse of powerful lights in crowded traffic, particularly in provincial towns, and under other similar unsuitable circumstances, we must admit that the Board are wise in attempting to deal with the difficulty. It does not, however, appear that they have given any definition of what a "searchlight" is. From one passage in the accompanying circular it would seem as if the Board contemplated prohibiting the use of powerful lights, the angle of which was frequently varied so as to impinge upon the road, sometimes at one point, and sometimes at another, though they do not expressly say so. Against this interpretation it can only be observed that no such lights on cars are in general use. On the other hand, we can hardly assume that the Board wishes to prohibit the use of powerful lights under all circumstances, for though they should, as we have frequently pointed out, be veiled or partially obscured in travelling through towns and thick traffic, they are an enormous advantage on open country roads, both to the drivers of the cars themselves and, in a less degeee, to other users of the roads, and, for anything like rapid travelling, are indispensable. In any case, we would beg the Board to promulgate at an early date a definition of what they mean by a "searchlight," for, as their regulation at present stands, it would seem to be open to any policeman to summons a motor car user for carrying a "searchlight," he having the same latitude in regard to what he considers a "searchlight" that he at present possesses in regard to the vexed question of what constitutes public danger.

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There is one other point in the new regulations (which are generally, as our readers will see, pervaded by a spirit friendly to the automobile movement) which we regret to find phrased as it at present is. In sub-section 6 of section 4 it is ordained that "any person having charge of a horse may call upon a motor car to stop by simply holding up his hand." In the corresponding provision formerly in force, the very important word "restive" occurred before the word "horse." A man who was driving a perfectly quiet horse, which displayed no symptoms of alarm at the approach of a motor car, was not entitled to stop it. Under this regulation any one driving a horse—and the term horse includes mules, jennets, and asses (with four legs)—even if he be an ancient Dobbin whose placid nerves would remain unruffled by the approach of Capt. Scott's Maxim-automobile firing rapidly, may, if he is hostile to automobilism and desires to enjoy the chagrin produced by an unnecessary stop, hold up his hand, and the driver of the car will have to stop, or be liable to punishment for committing an offence. This, surely, is putting in the hands of possible anti-automobilists a weapon which they will be but too likely in many districts to abuse, and will give a few of them in any neighbourhood the power to make things so unpleasant for automobilists as practically to prohibit the use of motor vehicles in the district. We commented on this omission at the time the draft regulations, which the Board submitted to the various bodies it was consulting, were under consideration, and we are sorry to find that the matter has been left just as it was. The interests of motor car users could have been safeguarded by the insertion of a single word, without doing any harm to anybody else. The insertion is one which justice demands on behalf of automobilists, but that word has nevertheless been omitted.

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The Eternal Problem.

The Royal Commission on London locomotion still continues its sittings, and every now and then its proceedings attain some degree of interest owing to important witnesses being called before it. One of those who recently gave evidence was the Hon. John Scott Montagu, who enunciated very much the same opinions as have been put before the Commission by a number of other witnesses. He is in favour of compelling the police to restrict the slow-moving traffic to the sides of the roads, and prohibit the unloading of vans in the principal thoroughfares between 10 a.m. and 8 p.m., and he suggests that raised crossings or subways should be provided for foot-passengers at dangerous points. These suggestions, if carried out, would unquestionably have a very great effect in alleviating London traffic. The manner in which heavy vans are permitted to draw up at the curb, even in thoroughfares like the Strand, and take any time they please in unloading their wares in the busiest hour of the day, is a scandal to civilisation; while the determination which the drivers of vans and heavy vehicles display to monopolise the very centre of every roadway prevents vehicles that are capable of attaining a reasonable speed from making their way through the traffic. The whole problem becomes more serious owing to the revolution which the motor vehicle has effected in our means of transit. For horse-drawn vehicles to be restricted to an average pace of five miles an hour through a great city is bad enough, but then that is only halving the speed of which they are capable. For motor vehicles to be similarly hampered means diminishing the speed of transit to one quarter of what is legally permissible. Mr. Scott Montagu incidentally illustrated this by pointing out to the Commission that it took longer to get from the Crystal Palace to Hampstead by automobile than from King's Cross to Peterborough. But though commissions may sit, and witnesses may give evidence, we doubt whether any drastic measures will ever be taken to adequately cope with the problem. There are too many vested interests. The right to block half the highway for his own convenience, in loading and unloading at all times of the day, is one which the English tradesman looks upon as sacred. But the people as a whole will have to take the subject in hand, and not permit such considerations to stand in the way of providing adequate facilities for locomotion in the metropolis.

A Public Danger.

A drunken man in charge of a horse and cart is in all conscience a sufficient menace to everybody who comes near him. But, if the driver is drunk, the horse is generally sober and retains some of the sense of which his custodian has succeeded in depriving himself. Consequently the combination, though often productive of accident, at least as frequently escapes without doing any damage. When, however, the driver of a motor vehicle becomes intoxicated, a smash is almost certain, and it is nothing short of a crime in an automobile driver to give way in this respect, as was done by the driver who careered about the Edgware Road, between twelve and one o'clock, one morning early last week. In tacking from one side of the street to the other he made a sudden dive into a four-wheeled cab, knocking down the unfortunate horse and smashing the cab to pieces. Mr. Curtis Bennett very properly sent the defendant to prison for one month, and although appealed to to commute the sentence to a fine, very wisely refused to do so. "If a month's imprisonment," said the magistrate, "cannot stop this sort of thing, I will make it three months, as the Act empowers me to do." We congratulate Mr. Curtis Bennett on his sensible severity. A drunken car driver is not only the worst of possible public dangers, but is the worst possible enemy also to the automobile movement.

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An Opportunity for Motor Boats.

The Woking, Aldershot, and Basingstoke Canal Company has for a long time been in liquidation, and we are always hearing that the canal is about to be put up to auction, a rumour which has been several times disseminated in the last couple of years, and has been once more revived, with the added suggestion that someone might wisely buy up the canal, fill it in, and employ it as a high-speed motor track. It is not a commendable suggestion. In the first place, a canal is a highway, and we take it that, if filled in, the legal limits of speed imposed by the Motor Car Act would be certainly enforceable upon it. In the second place, the expenditure required would be enormous. On the other hand, the canal, which runs through some of the most beautiful scenery in the home counties, might, with a little expenditure for dredging, cleaning, and repairing locks make the most delightful run for motor boats imaginable, and the motor boat is every month becoming more popular. A great feature of the canal is that it is accessible from the Thames, as it turns out of the Wey Navigation Canal, a couple of miles above Weybridge. There is some talk of extending the canal to Alton to join the Meon, and then it would be possible to run through from the Thames to Southampton. We feel convinced that a motor boat scheme is the thing for the canal, and it is an opportunity which the promoters of motor boating as a sport should not allow to slip.

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An Expert Witness.

We have had a good deal of fun from time to time about the sort of evidence that has been furnished in motor car cases in police courts, and in general these cases have been, for everyone but the defendants—who have generally been fined—highly amusing. The acme of absurdity was, however, as far as can be judged, reached in a recent case that came before the Brighton magistrates. A motor car driver was, as usual, arraigned for driving at an excessive rate of speed. It will hardly be credited that one of the expert witnesses produced by the prosecution was a bath-chair man, who was put forward as a particularly skilful judge in the matter of speed. It is possible that a bath-chair man might be an excellent judge of rates of travel up to about two miles an hour, but the clerk to the Brighton magistrates, who seemed to take him seriously as a competent witness in regard to the speed of motor vehicles in the neighbourhood of twenty miles an hour, must be a gentleman with a subtle sense of humour.

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Further Translations.

The motor is becoming the "leit-motif" of the dinner table, says the *Pall Mall Gazette.* "It has a language, a literature, an organ of its own, and the next English dictionary will have to be largely concerned with it." So will the technical dictionaries, particularly those that deal with foreign equivalents, though the difficulties of compiling such a dictionary are enormous. Both English and foreign languages are being gradually applied to motor car technicalities. The phraseology is in the making, and the difficulty of obtaining precise synonyms for different objects and parts is consequently immense. It is for this reason, doubtless, that we often have so amusing a half hour with the translators, and though things ought to be settling down we are continually reminded of the difficulties of technical translation, particularly the translation of automobile matters, by the weird products which occasionally issue from the press in the form of price lists and catalogues, of which the translations have, like the originals, been very frequently made in France. Among the latest instances that come under our notice we would quote the following portions of a description of a speed indicator:—

> "The transmitter is a small magnetic minuscule electric machine, which gives an alternative current by the rotation of a small piece of iron. In this machine the wire inductor is completely immobile, and is without brushes or rubbers liable to get worn and give a false measure through variation of contact. The rotation of the mobile part demands but an insignificant effort. Further, the small magneto being hermetically sealed, can be placed in any position, and receive oil, mud, dust, sand even, without the fear of deterioration. This little machine is worked by a *bracelet* of indiarubber, running from its pulley on the machine to a pulley on one of the wheels of the car in the simplest manner. The indicator is an *expanding galvanometer* and *invariable in its indications.*

Of course, we gather that the machine is really a speed indicator, which depends upon a small permanent magnet dynamo to give increasing voltage with increasing speed, a voltmeter indicating the speed attained. But the notion of a galvanometer, "invariable in its indications," is delightful, while the comic effect obtained by the use of the words, "a magnetic minuscule electric machine," for a small dynamo, is distinctly piquant. One is reminded of the classical instance in which the German word for automatic spool—"*selbstthätige Spule*"—was translated as "self-spoiler."

New speed regulations are to be put into force in Italy by the Minister of Public Works. In crowded towns the maximum speed is to be 12 kiloms. per hour, but in the country no restrictions whatever are to be enforced except the driving with proper consideration for other users of the road. Certificates of competency to drive are to be issued after official examination of each applicant.

AUTOMOBILE CLUB GENERAL MEETING.

If any of the members of the Automobile Club were in doubt as to the intense interest which is felt in its future management and prosperity, they would have been rapidly undeceived on entering the large room of the Institution of Mechanical Engineers on the afternoon of Thursday, the 10th instant. The attendance was phenomenal, every seat being occupied, and even the gangway and entrances being thronged by the 400 and more members who had come evidently determined to see that the manner in which the affairs of their club are to be managed during the coming year should undergo a radical reformation. Incidentally, the crowded and enthusiastic meeting was a testimonial to the power of the press. Had not the whole question of the management of the club and the crying need for reform in its administration been adequately ventilated and discussed in the columns of automobile journals, we venture to think that the meeting would neither have been so well attended, nor would those attending it have displayed the same intense and intelligent interest in the discussions which took place, and the motions that were proposed. The voting at the meeting itself, the resolutions of the reform party which were there triumphantly carried, and, above all, the election to the committee of the nominees of the reform party practically *en bloc*, constituted a signal triumph for the reform agitation. As in previous years the chair was taken by Mr. Roger Wallace. There was something of the incongruous in the fact that the chairman opened the proceedings by recounting how he had been involved on the way to the meeting in a bad cab accident, on his escape from which he was heartily congratulated. Probably, on future similar occasions, the Chairman of the Automobile Club will eschew the horse-drawn vehicle when attending meetings of the Automobile Club in his official capacity.

Mr. Wallace was supported by the three vice-chairmen, Col. Crompton, Lt.-Col. Mark Mayhew, and the Hon. John Scott Montagu, M.P., the majority of the members of the old committee also being present. The sitting occupied exactly four hours, from 5 to 9 p.m., a motion at 7.30 for an adjournment being defeated by a show of hands, only about five voting in favour of the motion. The result of the voting for the new committee was not analysed until the finish of the meeting, when at the last moment the scrutineers were able to place the results in the hands of the secretary, who at once read them out to the meeting. The result was a sweeping victory, from the reformers' point of view, as the whole 50 names recommended by the Reform Committee were elected with one exception, the name of Mr. W. J. Leonard being in the final list in substitution for that of Mr. E. R. Pickmere. The list of elected members were as as follows :—

Mr. F. P. Armstrong
Mr. W. H. Astell
The Hon. S. Bouverie
Mr. F. H. Butler
Mr. W. J. Bull, M.P.
Mr. Alfred F. Bird
Mr. E. Calthrop
Mr. E. Cozens-Hardy
Mr. Theodore Chambers
Captain H. Deasy
Mr. S. F. Edge
Colonel H. C. L. Holden
Mr. J. A. Holder
Mr. C. Jarrott
Mr. G. C. Ashton Jonson
Mr. C. Johnson
Mr. E. Keynes Purchase
Sir Wroth Lethbridge, Bart.
Mr. W. J. Leonard
Major F. Lindsay Lloyd
Lieut.-Col. Mark Mayhew
The Hon. J. S. Montagu, M.P.
Mr. Geo. Montagu, M.P.
Mr. Henry Norman, M.P.
Mr. J. R. Nisbet
Mr. Wilson Noble
Mr. J. Ochs
Mr. Mervyn O'Gorman
Mr. Robert Phillips
Earl Russell
Mr. Lionel de Rothschild
Mr. C. D. Rose, M.P.
Dr. Boverton Redwood
The Hon. C. S. Rolls
Sir D. Salomons, Bart.
Mr. F. Strickland
Mr. Paris Singer
Mr. J. Siddeley
The Hon. A. Stanley
Mr. C. Shaw.
Captain S. Smyth
Mr. S. Spooner
Mr. H. Sturmey
Mr. F. R. Simms
Sir J. Thornycroft
Mr. Robert Todd
Captain T. Tulloch
Sir E. Vincent, K.C.M.G.
Mr. Claude Watney.
Mr. H. Weguelin

Following the opening statement of the chairman, the report, balance sheet, and budget were submitted to the meeting, and after considerable discussion, in which Earl Russell, Capt. Deasy, Mr. C. E. Shaw, M.P., and several others took part, were unanimously passed.

The resolutions on the Agenda were then submitted *seriatim* to the meeting. The formal resolutions embodying certain necessary changes in the club rules were agreed to without comment, as was also the resolution according the warm appreciation for the work which has been carried on since the formation of the club by Mr. Roger W. Wallace, K.C., the retiring chairman of the club, and asking Mr. Wallace to accept the position of legal adviser for the ensuing year at a retaining fee to be agreed upon with the club committee.

Upon the Earl of Shrewsbury's motion being put the proceedings became a little more lively, Lord Shrewsbury seeking by his motion to exclude all members of the trade and journalists connected with automobile journals from being eligible for membership to the committee—the definition of "member of the trade" to be settled by the committee of the club. Mr. Charles Jarrott had a motion, which was a direct negative of Lord Shrewsbury's proposition, and which was taken as an amendment. Mr. Jarrott's resolution was as follows :—

"To resolve that, in view of the fact that this club is primarily a Society of Encouragement, and was founded for the greater part with the monies and by the energies of gentlemen who were, or who have since become, administrators of companies engaged in the manufacture or selling of motor vehicles and accessories, any attempt to secure that this section of members of the club should not be represented by some of their number on the club committee would be unjust, unconstitutional, and fraught with danger to the club as a Society of Encouragement."

Lord Shrewsbury and Mr. Jarrott each introduced their motions with a few explanatory remarks, and the discussion was taken up keenly by Lord Russell, Mr. Henry Norman, M.P., Mr. C. D. Rose, M.P., etc. When put to the meeting, Lord Shrewsbury's motion was negatived by an overwhelming majority, and, in answer to a demand by one gentleman for a poll, Lord Shrewsbury at once saved the time of the meeting by unconditionally withdrawing his motion, acknowledging the signal defeat which had been sustained.

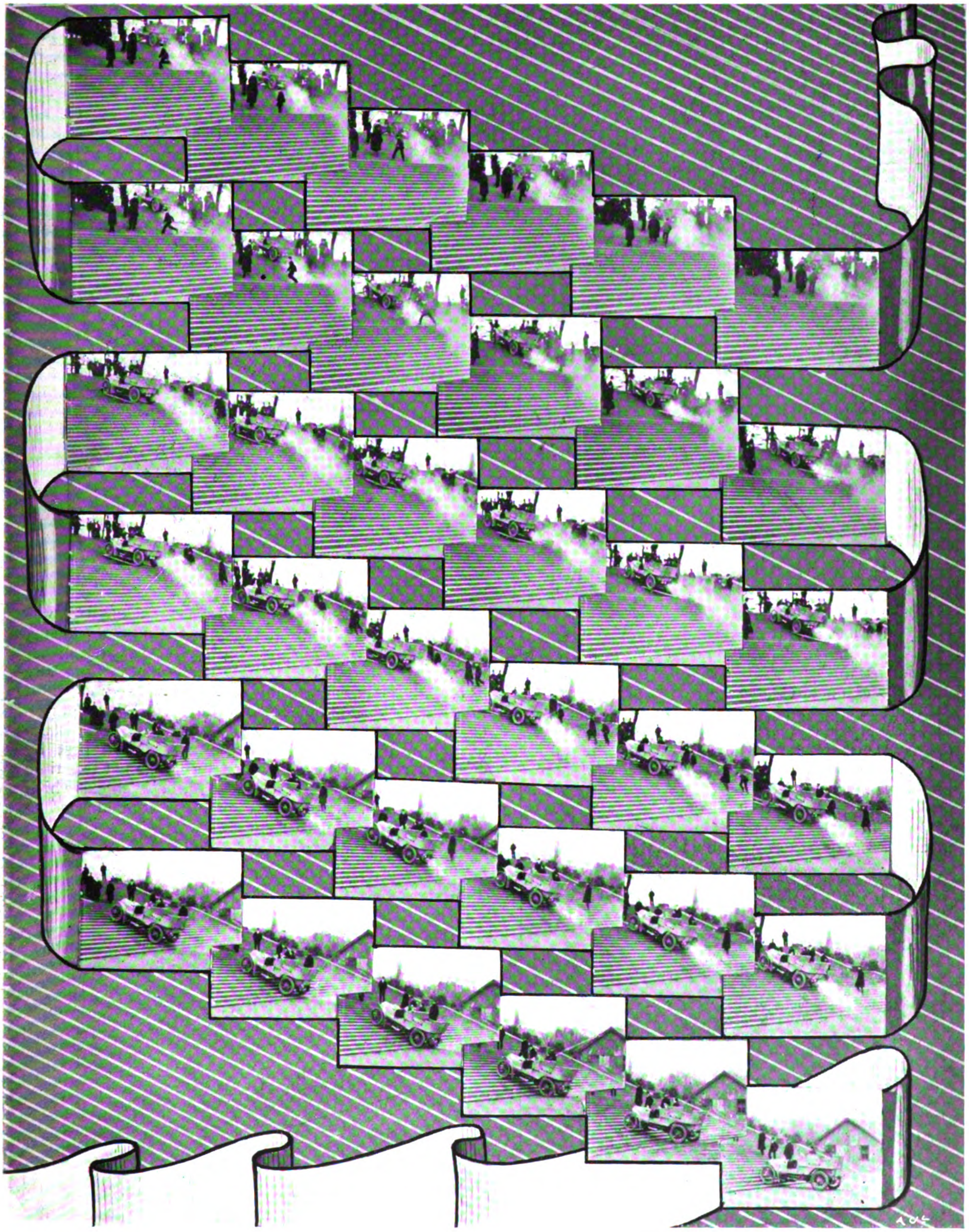
A resolution was then moved by Mr. John Scott Montagu, M.P., and again passed by a large majority to the effect that no member who is in receipt of a grant, fee, payment, or other monetary remuneration from the club shall be eligible to serve as president, vice-president, chairman, or vice-chairman of the club.

A resolution in the name of Mr. Campbell Swinton by which he sought to have a ruling that all discussion and criticism by a member of the club on any affairs of the club in the public press, and that members of the committee should resign their seats before taking any independent action in regard to the doings of the committee, was also rejected on a show of hands.

The question of bestowing the club's patronage on any shows, exhibitions, association, or societies, in future, as also a motion to appoint a supreme council of the club, were left over for the consideration of the new club committee, whilst the final motion on the paper, being a request under Rule 55 for information in regard to a number of statements which appeared in the club *Journal* on February 11th, in connection with the negotiations culminating in the giving of the patronage to Mr. Cordingley's Exhibition, were replied to from a written document of a very lengthy nature by the chairman, it being asked that these answers should be published in the club *Journal*.

The question which aroused the most pronounced feeling was the much debated letter issued to the County Councils some little time ago. Mr. Ashton Jonson asked the direct question as to who sanctioned the issue of the letter. The chairman claimed not to answer the question on the ground that discussions in committee were private, and should not therefore be laid before a General Meeting. Mr. Henry Norman, M.P., stated that a number of members of the committee themselves, who had strongly disapproved of the letter, had endeavoured in vain to discover who was responsible for its issue. The meeting, being still very dissatisfied, pressed for the information required, and after considerable fencing, Mr. Rees Jeffreys, the administrative secretary, was called upon to explain the circumstances, and stated that he had himself drafted he letter and sent it before issue for approval to the chairman, Mr. Roger Wallace, Colonel Crompton, and Mr. Worby Beaumont. Mr. Wallace stated that he had no recollection of ever having seen the letter, and Mr. Beaumont called for the original MS. to be produced with his alterations thereon, Colonel Crompton stating that although the letter was sent to him he had cut out three-quarters of it and returned it to Mr. Jeffreys, and further affirmed that the letter was not published quite in the form that it had left him. One thing was made quite clear, the letter had never been seen by the club committee and had not come before the executive committee.

Not only was the feeling of the meeting strongly in favour of Mr. Scott Montagu's list of candidates for the committee, and the resolutions standing in his name, but the feeling amongst club members generally was demonstrated from the fact that the three sets of proxies which had been sent out had resulted in the following numbers being returned :—Mr. Scott Montagu, 518 ; Lord Shrewsbury, 232 ; Mr. Roger Wallace and the vice-chairmen, 135. The result of the poll, therefore. and of the fate of the various resolutions, was a foregone conclusion, had a poll been demanded, which, however, was entirely unnecessary, as in no case was there any doubt as to the feeling of the meeting, even when a show of hands was taken upon any of the points raised.



From time to time some remarkable feats have been accomplished by motor cars climbing steep steps in different parts of the world. Recently a series of successful attempts have been made at the Crystal Palace, on the first occasion with an Oldsmobile driven by Mr. Letts. During the Automobile Show which was held at the Palace, both a Lanchester car and a Gobron-Brillie car succeeded without difficulty in driving up the steep steps leading to the Terrace in the Palace grounds. Our series of cinematograph photographs which we reproduce above show the Gobron-Brillie car ascending these steps from the bottom to the top, and form an interesting record of this performance. The pictures are from photographs by the Charles Urban Trading Company, Limited.

THE LATEST DE DION-BOUTON PETROL CAR.

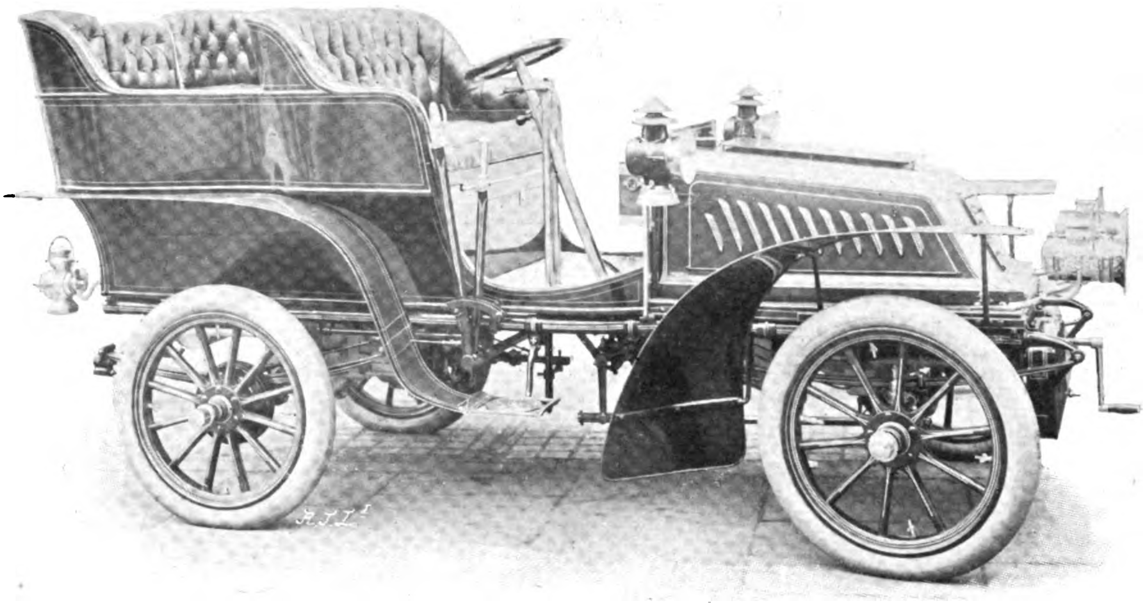


FIG. 1.—A 10-h.p. De Dion-Bouton Petrol Car.

THERE are few better made or more widely known motor vehicles on the market than those manufactured by the De Dion-Bouton Company, of Paris, a firm that ranks amongst the earliest pioneers in the automobile movement, and one to whom an enormous amount of credit is due in connection with the development of high-speed petrol-motors. It is difficult to over-estimate the value that their attainments have been to the entire industry since its commencement, and, over and above this, thoroughness of design and excellence of workmanship have always been characteristic of their products. The De Dion tricycle itself, though now practically extinct, not only enabled the present forms of motor-cycle to be successfully constructed, but was the first satisfactory machine of any kind in which a high-speed petrol-motor was shown to be practical. It may, in fact, be said that the De Dion-Bouton Company has done as much, if not more, than anybody else towards the development of the up-to-date petrol-engine. The thoroughness displayed by the firm in connection with their designs is perhaps shown best by comparing their original voiturette—which at the time that it was introduced was unique—with the vehicles which they are now making; for although the general arrangement of the transmission mechanism is now different, to suit the altered requirements, yet practically the same

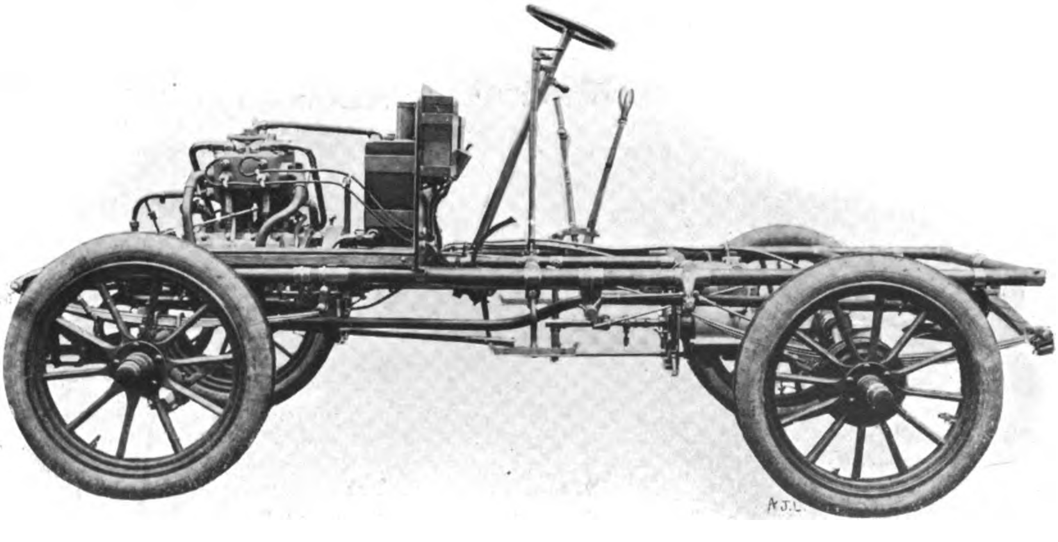


FIG. 2.—View of the 10-h.p. De Dion Chassis from the left side.

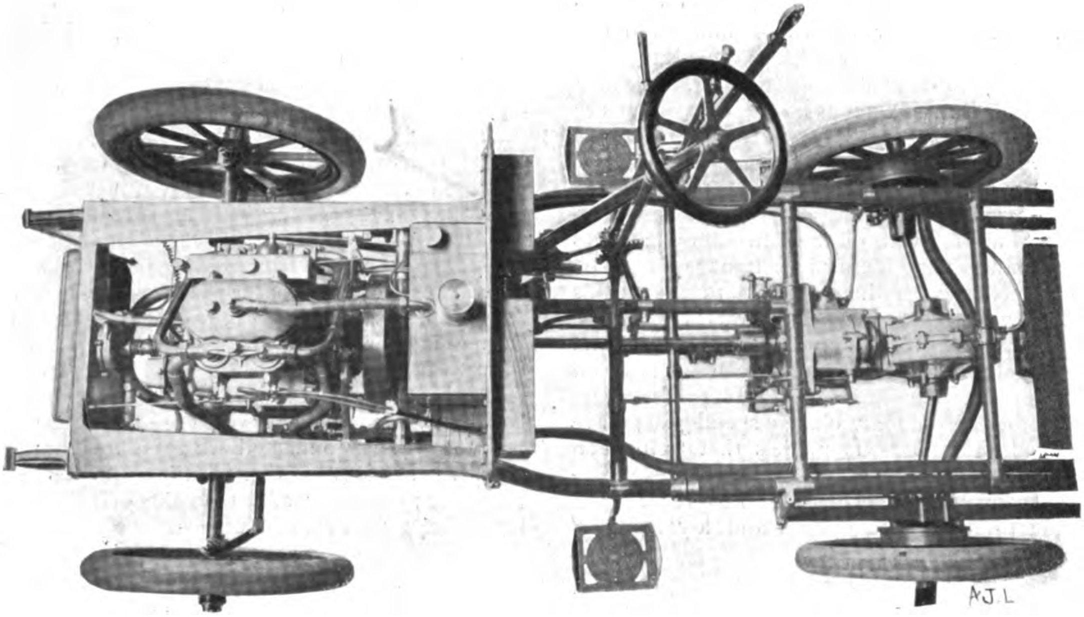


FIG. 3.—View of the 10-h.p. De Dion Chassis from above.

form of change-speed-gear, with but very small difference in detail, has been adhered to, even in their latest models. Few makers—even amongst those who can lay no claims to having developed original systems of their own—can make a similar boast.

The Company now have four standard types of car, two of which are fitted with single cylinder, and the other two with twin-cylinder, engines. They are of 6, 8, 10, and 12-h.p. respectively, and most of them have already been referred to, more or less briefly, in our columns on different occasions in the past. Several minor, though important, alterations have been made in them all quite recently, and the 10-h.p. car, to which we are about to turn our attention in particular, is quite a new model this year. The general arrangement of the parts on all of them is to a great extent uniform, and is specially interesting because it differs considerably from that in any other make of car. The special features of the De Dion vehicles are the tubular frame; the absence of any main-clutch; the employment of expanding clutches in conjunction with meshing gear-wheels in the change-speed-mechanism; and the adoption of "cardan" shafts to transmit the power from a differential-gear, mounted on the frame, to road-wheels, running on the ends of a peculiarly-shaped stationary back-axle. Atmospherically-operated inlet-valves are still fitted to all the engines, but considerable

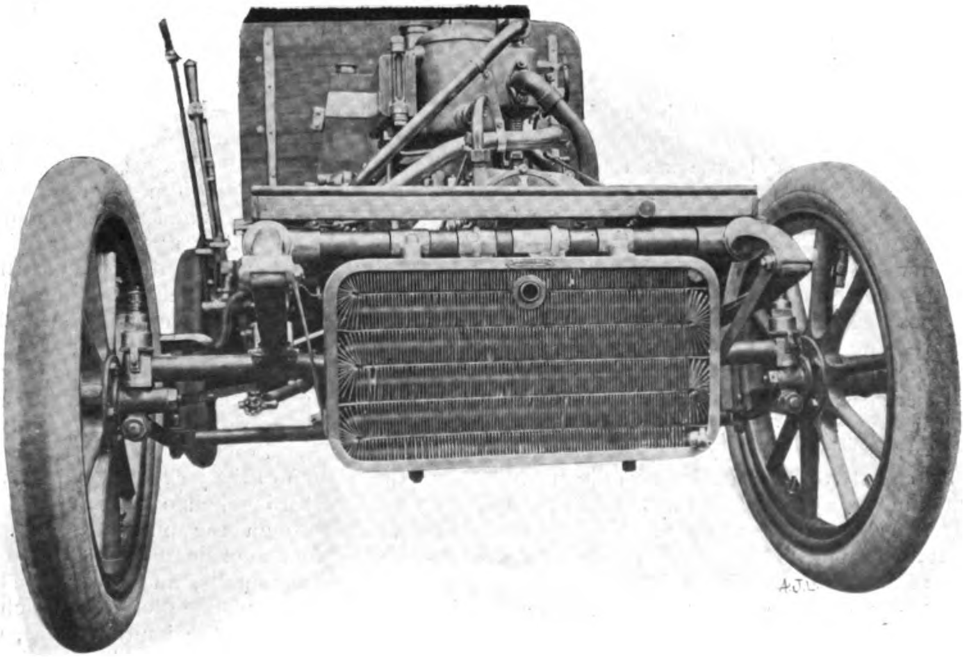


FIG. 4.—Front view of the 10-h.p. De Dion Chassis, showing the front axle and the radiator.

improvements have been made in connection with the carburettors, particularly for the twin-cylinder models. The construction of the cylinder-castings themselves has also undergone a good deal of alteration lately, these now being formed with large openings at the top, which are subsequently closed by separately-cast covers of ingenious design. The lubrication of the larger engines also has been still further improved, and not only is the oil circulated by a gear-driven pump, but the "big-end" connecting-rod bearings are fed with oil from inside by passages drilled in the crank-shaft. Other important points to be noted in connection with the engines are the means provided for regulating the power, by varying the time at which the exhaust-valve is allowed to close, and the sliding-cams by which the compression can be reduced for starting.

Quite a number of different change-speed-gears have been introduced on the various models that have been put on the market during the last few years, these varying from a gear giving two speeds and no "reverse" to one providing three forward speeds and a "reverse." Some of these mechanisms have been shown and described by us previously, so that it is not necessary on this occasion to attempt to deal with them all, or to point out the differences which exist between them. None of them differ at all in principle, and most of them do so in comparatively small respects only, so that a thorough comprehension of the latest model will enable anyone to understand the general working of the others. The 1904 type 10-h.p. car is the most recent, and it is therefore to its gear that we shall confine our attention in this article. Before concluding this general introduction—which will be followed by a thorough description of the 10-h.p. vehicle, and a brief description of the 6-h.p. "Populaire" model—it should be stated that the De Dion cars are of very strong construction throughout, that the workmanship is of a very high order in every respect, that very great care has been taken to obtain the best material for every part, and that the vehicles are so arranged as to be easily manipulated. Strong features possessed by them, also, are that neat spring catches are employed instead of set screws wherever possible, and that, in addition to the lubricating systems for the chief mechanisms, all the bearing surfaces throughout the car, however relatively unimportant they may be, are fitted with small oil cups. Special attention should further be called to the fact that an adjustment is provided for taking up any wear in the foot-brake in such a way that there is no excuse whatever for its failure to act properly at any time.

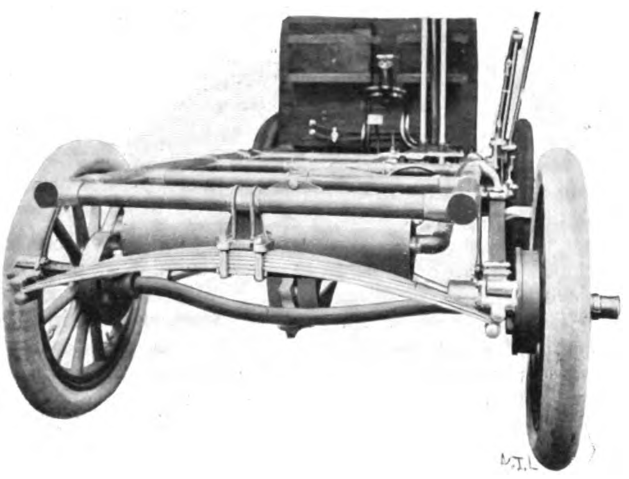


Fig. 5.—Rear view of the 10-h.p. De Dion Chassis showing the back axle and inverted transverse spring.

One of the 10-h.p. cars is shown in Fig. 1, and the complete chassis is seen from four different points of view in Figs. 2 to 5 inclusive—from the left side in Fig. 2, from above in Fig. 3, from in front in Fig. 4, and from behind in Fig. 5. The construction of the tubular steel frame is well indicated in these illustrations, and it will be noticed that the engine, and that the gear-box together with the casing enclosing the differential, are both rigidly fixed direct to it. The frame is carried on long semi-elliptic springs above each of the axles, and the rear ends of those at the back are supported by an inverted transverse spring, as seen in Fig. 5. Both axles are tubular, and are of somewhat unusual construction. The front axle, together with its steering heads, is well seen in Fig. 4; the wheels run on ball bearings on the stub-axles. The back-axle is bent rearwardly at its centre so as to form a loop round the differential casing, and so as to support the bearings for the road wheels, without interfering with the short live-stub-axles that pass through the centre of those bearings. For the moment it may be considered that the car has a strong stationary back-axle, to the ends of which are fixed the side-springs by which it is connected with the main-frame, but we shall refer to the construction of this axle again presently; we may add that the drive is transmitted from the axle to the frame through the springs, as there are no radius-rods provided.

The road-wheels are of the artillery type, and their rims are made to suit 30 by 3¼ in. Dunlop tyres, of the thickened-edge type. The vehicle has a wheel-base of 6 ft. 7 in., and the track is 4 ft. The frame lies about 24 ins. above the ground, and its width across is 33 ins. The weight of the car, with its standard 4-seated body, is about 15 cwt., and it is geared so that it can run at speeds of up to about 40 m.p.h.

Figs. 6 and 7 are views of the engine fixed in place in the chassis, and are taken from either side — the former from the right, and the latter from the left. The construction of the engine is also shown sectionally in Fig. 8, where the new form of head, which we have already mentioned, is clearly shown. The cylinder-casting, A, forms the two cylinders and the portion of the jacket that surrounds them. The upper ends of the cylinders themselves are left open during construction, and are finally closed by an inner and an outer plate, which are bolted together. The inner plate is solid with the projecting bolts, A^2, and the outer plates, A^3, are held down by nuts on those bolts, inside the water-jacket. The same bolts serve for securing the top of the water-jacket, A^1, in place, and for tightening the face joint between it and the casting, A. Provision is made for leading the water into the bottom of the jacket through either of the plug-holes, A^4, and it is taken out at the top of the jacket-cover, A^1, through the pipe-fitting, A^5. Provision is made at A^6 for the ordinary high tension ignition plug, which lies horizontally, and enters the valve-chamber between the valves. The plugs, A^7, which are fitted into the jacket just below the ignition plugs, carry porcelain insulators, through which the high tension wires are led to the plugs. Both atmospheric inlet-valves are held

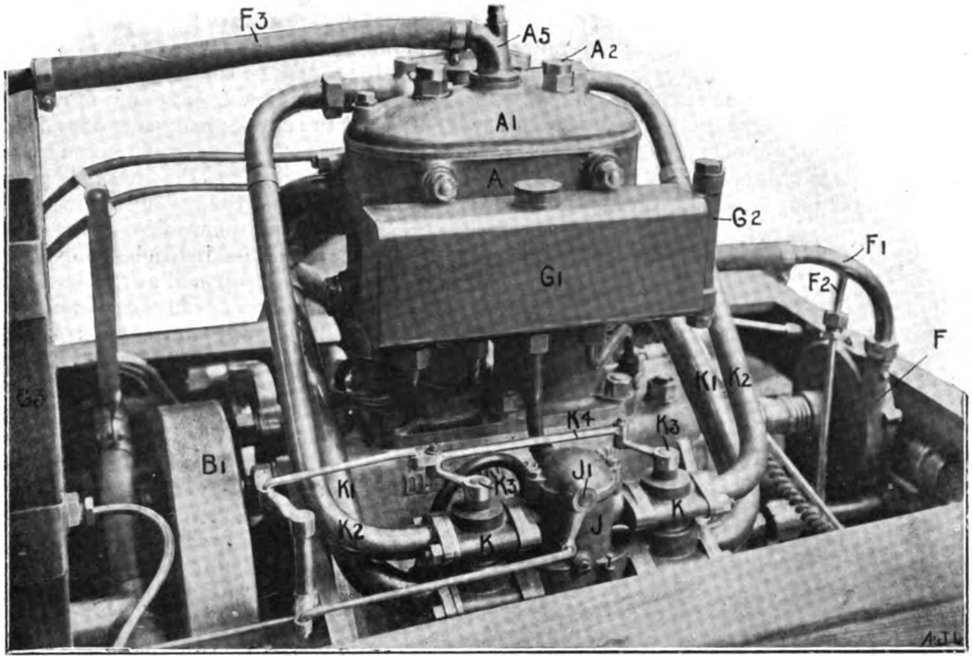


FIG. 6.—View of the 10-h.p. Engine from the right side of the Chassis, showing the position of the carburettor.

down in place by a single yoke, A^8, and one nut, the ends of the yoke pressing upon the induction pipe fittings which enclose the valves.

The aluminium crank-chamber, which is constructed in two pieces, and provides bearings for each end of the two-throw crank-shaft, B, is so made that the oil is fed to these bearings through the ports, B^2, and that it finally collects in an oil well in the base. The crank-shaft is drilled as indicated in Fig. 8, in such a manner that the oil is conducted through it, and is thrown out by centrifugal force through the centre of the crank-pins into the "big-end" bearings of the connecting rods. The splashed oil is also collected by centrally-arranged gutters, by which it is conducted into that portion of the

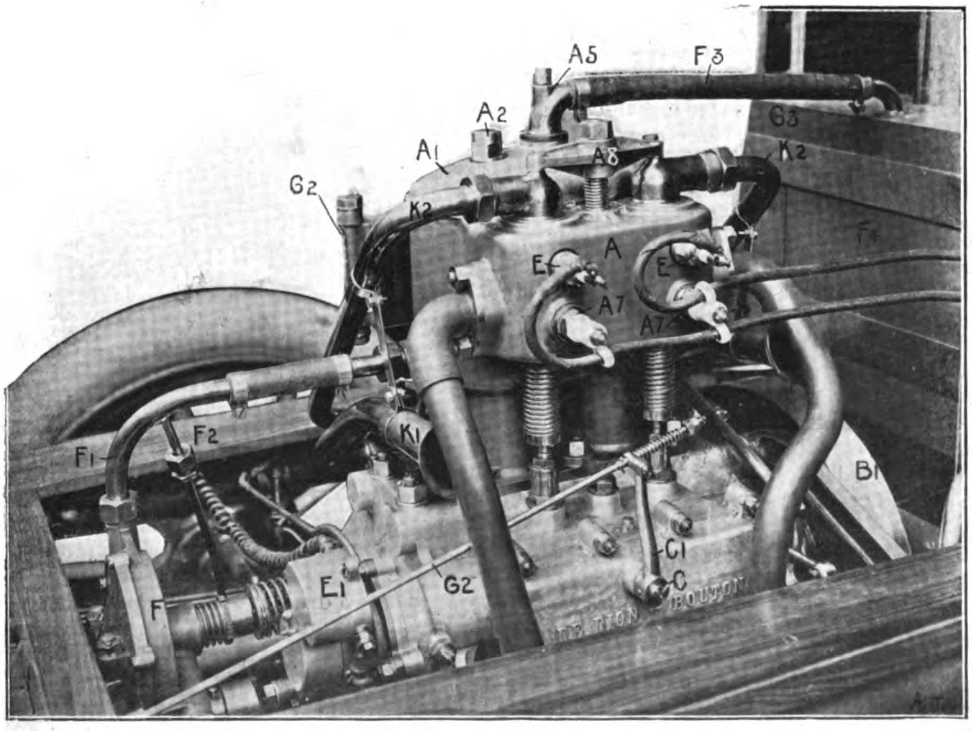


FIG. 7.—View of the 10-h.p. Engine from the left, showing the valve-gear, commutator, circulating pump, and ignition plugs.

upper crank-chamber casting which contains the cam-shaft. The cylinders have a bore of 90 mm., the stroke is 110 mm., and the engine develops its normal power at about 1,500 revs. per min. The valves are 42 mm. in diameter, the weight of the engine itself is 172 lbs., and the flywheel, B^1, which lies outside the crank-chamber, has an additional weight of about 53 lbs.

The cam-shaft is driven through an intermediate spur-wheel from the crank-shaft, and all three wheels are enclosed. A separate pinion driven by the intermediate wheel is used for driving the circulating pump, F, and the commutator is fitted on the front end of the cam-shaft. The cam-shaft carries the two cams for lifting the exhaust-valves, and also a worm by which the vertical spindle of the oil-pump, G, is driven through a corresponding worm-wheel. The cams themselves have half-compression projections formed upon them at one end, and the cam-shaft itself can be slid longitudinally to allow these projections to operate the push-rods. In this way the compression can be considerably reduced when starting the engine, as the exhaust-valves are opened during the earlier part of the compression strokes, as well as during the whole of the exhaust strokes. The longitudinal movement of the cam-shaft is controlled from the front of the car by the rod, C^2 (Fig. 7), which engages with the lever-arm, C^1; the lever-arm, C^1, is fixed to a spindle, C, which, inside the casing, carries a fork, engaging in a groove on the cam-shaft.

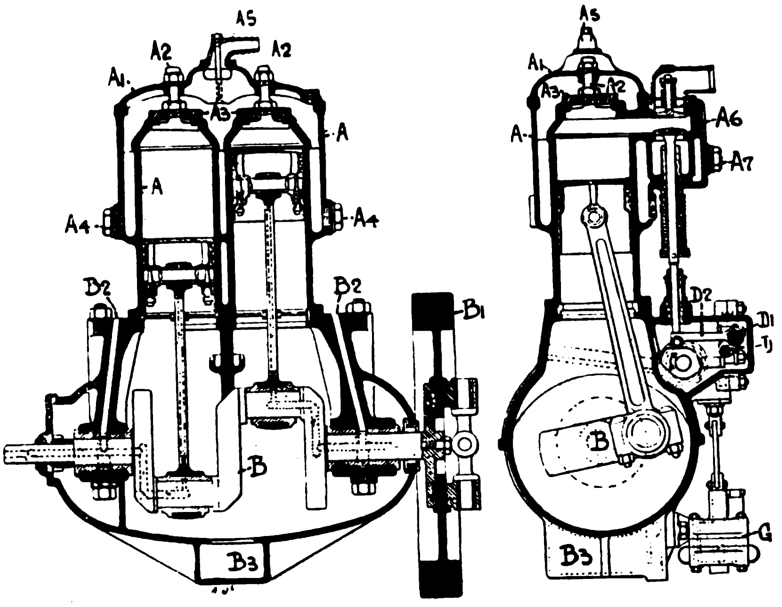


FIG. 8.—Longitudinal and transverse sections of the twin-cylinder De Dion Engine, showing the new construction of the cylinder heads.

The cams do not actually come into contact with the push-rods, for the small levers, D^2, one of which is seen in Fig. 8, are introduced between them. This lever is fulcrumed on a crank-pin, D^1, at its one end, and it carries a small round boss, which rides on the cam at its other end. The crank-pin, D^1, forms a part of a small crank-shaft, D, which is carried in bearings in the casing, so that it can be rocked about its axis by the driver. As the shaft, D, is rocked in this manner, the small boss is moved further over beneath the push-rod instead of lying immediately beneath it. The shape of the cam and its direction of rotation are indicated in the drawing, where they are in the position which they assume when the exhaust-valve is about to be lifted. It will be noticed that the upper face of the cam is then horizontal, so that the moment at which the valve is opened remains the same, whatever may be the position of the boss upon the cam-face. Should the boss be moved sufficiently far in towards the crank-chamber proper, it would be moved out of the path of the cam and remain inactive. In practice, however, the lever, D^2, cannot be placed in this extreme position, so that the exhaust-valve never remains closed during the whole cycle of operations. When the boss is fed in to a lesser extent than this, the valve will be opened at the same time, but it will be allowed to close earlier and earlier, as the boss is moved in towards the engine. A very effective means for controlling the power of the engine is thus provided, since any desired proportion of the exhaust gases can be retained in the cylinder, and thus the quantity of fresh mixture, which is drawn in during the suction-strokes, is varied. This exhaust-valve regulator is connected with the brake-pedal (V) on the car, so that the engine is automatically slowed down before the foot brake is actually applied.

The commutator is used in conjunction with a battery of dry cells, and with coils, which are fitted in neat wooden cases behind the dash, and it is of special construction, as seen in Fig. 9. The base, E^2, is an iron casting, which fits over a circular boss surrounding the end of the cam-shaft, and is held in place by the two spring catches, E^3, that engage in a groove in the boss. The adjustable contact screws, E^5, are fitted in the usual way on pillars, and these pillars are insulated from the casting, E^2, though they are in electric connection with their respective terminals, E^6. The "earthed" contact-blade is fixed to a forked casting, E^4, which is pivoted at the centre, and carries inwardly and outwardly projecting pins at the ends of its arms. This fork is normally held in the position shown in Fig. 9 by a helical-spring around the pivot-pin. It is caused to make contact alternately and at the required times with each of the platinum-pointed screws, E^5, by the cam, E^7, which has two distinct cam surfaces, one engaging with each of the pins on the fork, E^4. The moving parts are completely enclosed beneath an aluminium cover, E^1, which is held in place by the lever-nut, E^8, centrally. It will be noticed that the commutator can be instantly removed without disturbing the cam, and, also, that a very quick break is ensured for both cylinders. Dry batteries are used

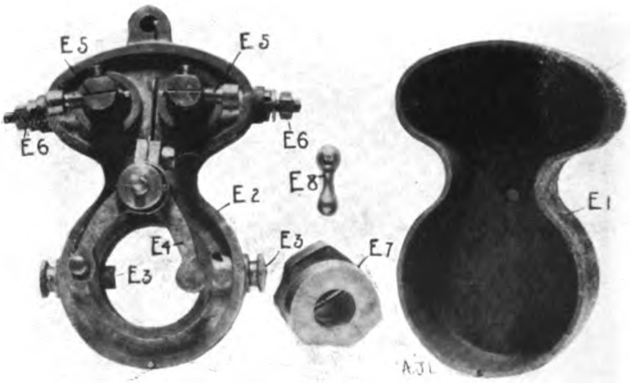


FIG. 9.—The De Dion Commutator, together with its cam, for twin-cylinder engines.

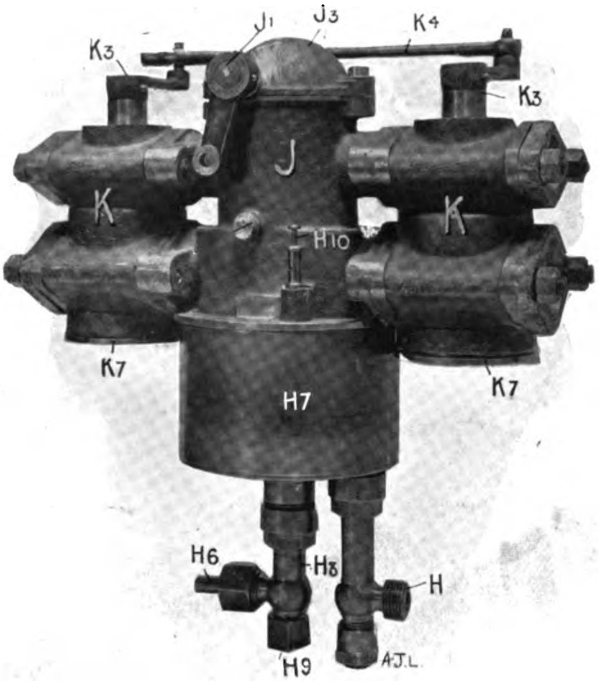


FIG. 10.—The new De Dion Carburettor for twin-cylinder engines.

instead of accumulators, and the ordinary high-tension ignition-plugs, E, are employed; the porcelain insulators supporting the high-tension wires beneath the plugs are well shown in Fig. 7. "Timing" is effected by rocking the commutator about the cam-shaft in the usual way, the uppermost of the three small hand-levers near the steering-pillar being provided for this purpose.

The cooling water for the cylinder jackets, and also for the carburettor, is circulated by the centrifugal pump, F, which—as seen in Figs. 6 and 7—is fixed to the front of the frame, and is driven through a helical-spring. The pump forces the water through the pipe, F^1, to the bottom of the cylinder jacket, and through the small branched pipe, F^2, to the carburettor. The water then finds its way back to the tank, F^4, which is fixed in front of the dash, and from there it is led through the radiator—beneath the frame in front of the car—to the pump once more. The form of radiator used is well seen in Fig. 4. The water-tank, F^4, is made in one piece with another smaller tank, G^3, in which the lubricating oil is carried, the oil being thus kept sufficiently fluid in cold weather by the heated water.

The lubrication system for the engine has already been briefly touched upon, and it has been pointed out that the pump, G, is driven from the cam-shaft whenever the engine is running. This pump takes the oil from the well, B^3, at the base of the crank-chamber, and delivers it into a tank, G^1 (Fig. 6), which is fixed to the cylinder casting on the right side of the engine. From the tank it flows back by gravity to the crank-shaft bearings, from which it is distributed to all the moving parts, as we have explained. A protected gauge, G^2, is provided on the tank, G^1, to show the level of the oil in it.

The carburettor is one of the most interesting portions of this car, and differs both from those of other makers, and from previous De Dion models, in several important respects. To some extent it may be said that there is a separate carburettor for each cylinder, but this needs qualifying by adding that one float-feed device serves for the two jets, and that both carburettors are so connected together that they are controlled simultaneously, and to the same extent at all times. Each carburettor has its own throttle-valve and also its own valve for regulating the relative quantity of diluting air which is mixed with the carburetted air. The whole of the air supply for each carburettor is led through a single pipe from the neighbourhood of the exhaust-pipe passing from its own cylinder, and a variable proportion only of this air passes the spray jet. The whole of the air, too, is controlled by a throttle-valve, and this throttle-valve is connected with a similar valve in the induction pipe, so that the two passages—to and from the carburettor—are opened or closed to a proportional extent simultaneously; as a matter of fact the valve controlling the air supply has a slight lead over the valve in the induction pipe, so that when the latter is quite closed the former is still slightly open. Heat, to prevent freezing due to the rapid evaporation, is derived by the carburettor from two sources, for not only is the air supply warmed by the exhaust pipes, but a chamber is formed in the base of the casting carrying the jets, and part of the circulating water is forced through it.

The carburettor is fixed on the right side of the engine—as seen in Fig. 6—the air-supply pipes, K^1, and the long induction pipes, K^2, being led across to it from the other side. The complete carburettor is shown in Fig. 10, the various portions of it (taken apart) will be in Fig. 11, and sectional drawings of it in Fig. 12, so that the details of its construction can be readily gathered.

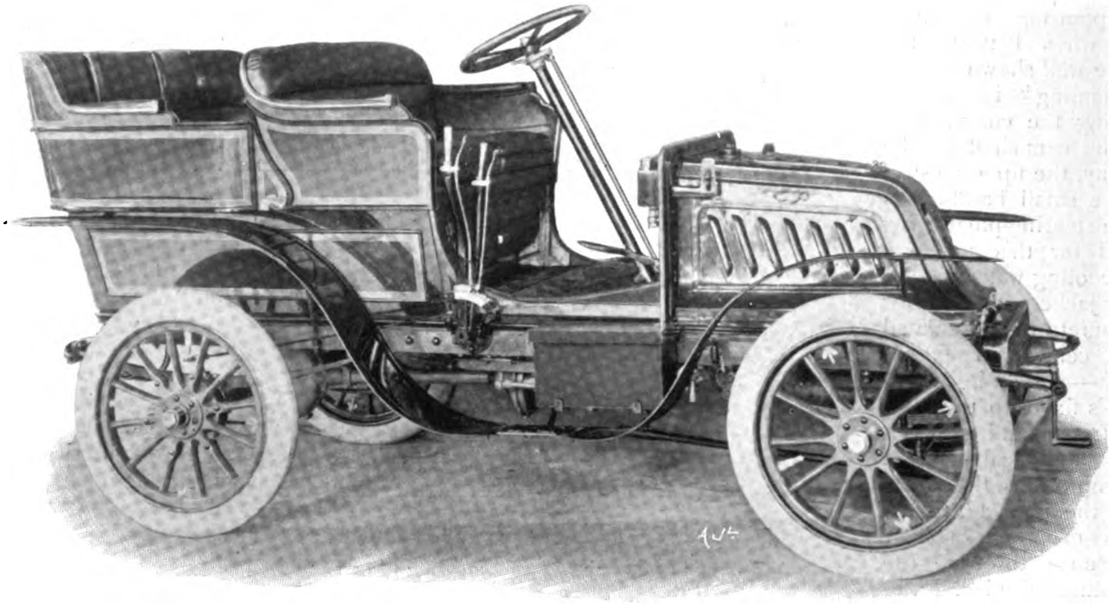
(To be continued.)

THE profitable nature of properly conducted exhibitions is exemplified by the reports to hand of the sums netted in America over the New York and Chicago Shows. The net receipts of the New York, Madison Square, Show are divided between the N.A.A.M. (30 per cent.), the A.C. of America (30 per cent.), and the Madison Square Garden Company (40 per cent.). After deducting £4,000 against expenses, the N.A.A.M. and the A.C.A. have both already received £3,000 each, and £400 still remains over for division. In round figures this gives a total of about £10,000 net profit. About half this amount has been netted at Chicago. There the arrangement is that the first £1,200 net profit goes to the general manager of the N.A.A.M., and the balance is taken: two-thirds by the Association, and the other third added to the general manager's profits.

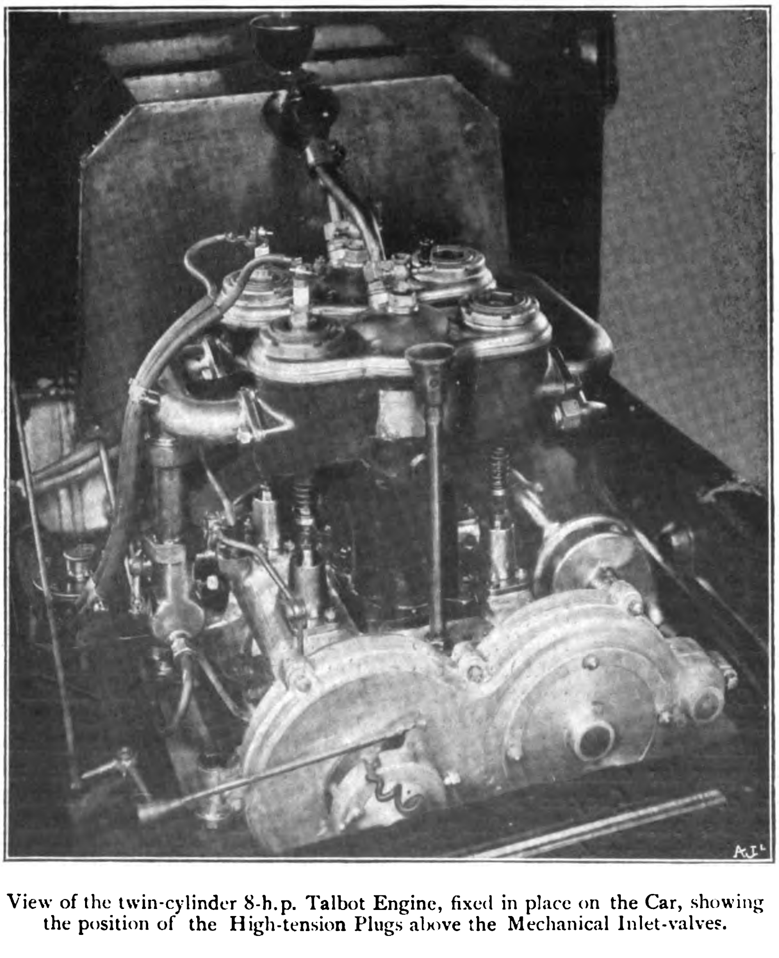
THIS week the entire stud of harness horses of Sir Oswald Mosley, of Rolleston Hall, Burton-on-Trent, were up at Tattersall's for sale, Sir Oswald having determined to mainly use motor cars for the future.

INTERESTING experiments have been carried out by the Belgian military authorities in regard to the practical value of an automobile artillery department. Arrangements were made for conveying a battery of guns, with the necessary ammunition and artillerymen, to a particular point; the men and officers being transported in ordinary automobiles, and the guns and ammunition in "Pipe" lurries. The whole battery of artillery, men, officers and ammunition was re-transported back to Brussels after a series of evolutions in the field, and the general opinion appears to have been that the operations were most satisfactory.

THE TALBOT PETROL VEHICLES.



An 8-h.p. Talbot Standard Tonneau.



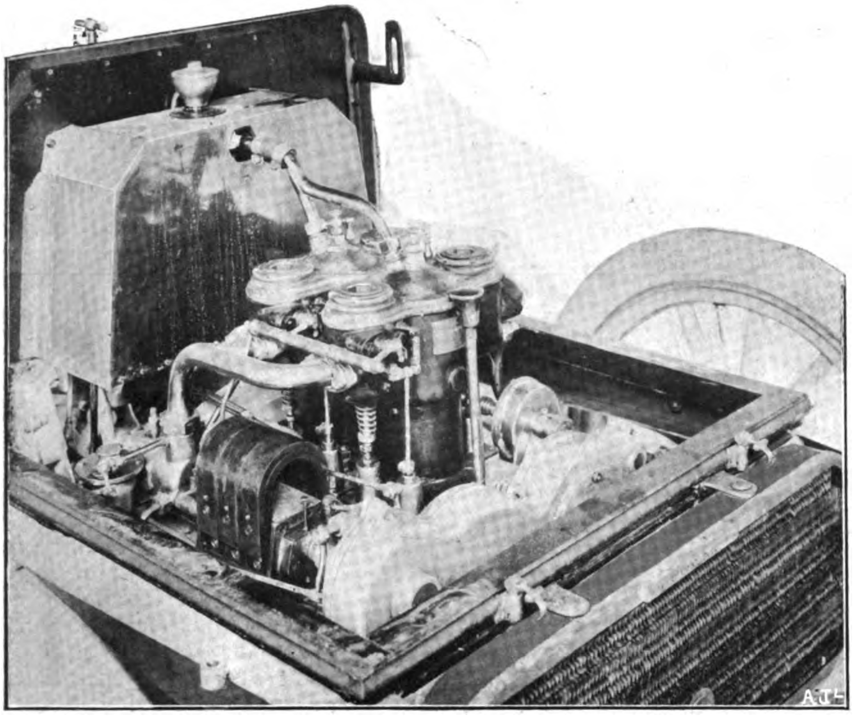
View of the twin-cylinder 8-h.p. Talbot Engine, fixed in place on the Car, showing the position of the High-tension Plugs above the Mechanical Inlet-valves.

IT will be remembered that the new Talbot cars for 1903 were brought before the notice of the public at the National Show in November last, and they were at that time described at some little length in our columns (Vol. VIII., p. 1270). Since then they have been prominent features both of the Paris Salon and of the Crystal Palace Exhibition, so that it is unnecessary for us to refer in any great detail to their construction.

We are, however, able to give the accompanying illustrations representing an 8-h.p. standard Talbot tonneau, and showing the engines on the 20-h.p., the 11-h.p., and the 8-h.p. vehicles.

The general characteristics of all these three cars are the same, and it will be noticed that each of the engines have their cylinders cast separately. One of the 20-h.p. chassis was shown in the previous description to which we have already referred, and in it the arrangement of the engine and gear-box on the underframe that forms a part of the pressed-steel frame, was rendered particularly clear. All three vehicles are of the live-axle type, and the two larger models have a low-tension system of ignition only—the 8-h.p. having high-tension coil ignition instead.

The cylinders on the 20-h.p. model have a bore of 90 mm., and the stroke is 120 mm.,



View of the 11-h.p. twin-cylinder Talbot Engine in place on the Car. The positions of the Finned Radiator and of the Water Tank are also seen.

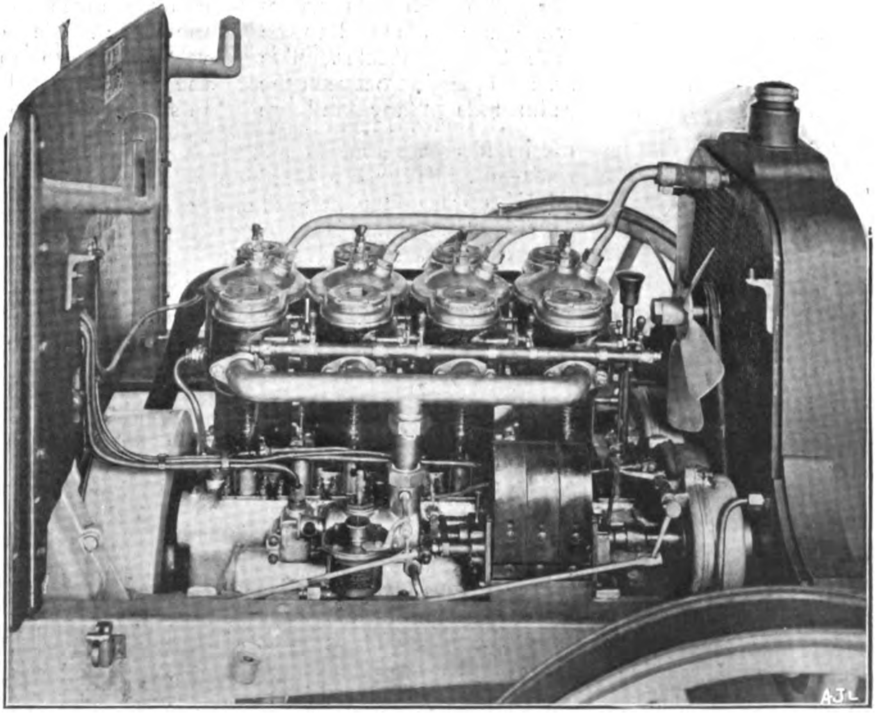
and these cylinders are identical with those on the twin-cylinder 11-h.p. car. As will be seen, the 8-h.p. engine very closely resembles the 11-h.p.; but its cylinder dimensions are 80 by 100 mm. The Talbot automatic carburettor, which is water cooled, and which it will be remembered has a spring-loaded auxiliary air-valve, is in all cases fitted, and is visible in each of our three illustrations of the engines. The inlet-valves are on the right, the exhaust-valves on the left, and the inspection-plugs screw into the cylinder-castings above each. On the two larger engines a timed low-tension igniter is fitted into the side of each inlet-valve chamber, and on the small vehicle it will be noticed that the high-tension plugs are vertical, and are screwed into the inspection-covers above the inlet-valves. All three engines have automatic governors, and on all of them the water-pump is gear-driven, all gear-wheels being enclosed in oil-tight casings.

On the 20-h.p. car a honeycomb radiator forms the front of the bonnet, and on the smaller vehicles a finned radiator, through which passes the starting handle, is fixed beneath the frame in front of the bonnet, and an auxiliary water-tank is provided in front of the dash.

Except on the 8-h.p. car, hydraulic pressed steel-frames are used, but on it a frame of the armoured-wood type is substituted. Each of these cars has three forward-speeds and a reverse, and the gear-box is so made that a direct-through-drive is obtained on the top speed. All three brakes on each model are of the internal-expanding type, with metal-to-metal friction surfaces, and these are so designed that they act equally well forwards or backwards, and that they are protected from dust and dirt.

The wheel-base of the 20-h.p. vehicle is 7 ft. 8 ins., that of the 11-h.p. model 6 ft. 6 ins., and of the 8-h.p. car 5 ft. 10 ins. The respective tracks on the three machines are 4 ft. 6 ins., 4 ft. 2 ins., and 4 ft. Clincher-Michelin tyres are, as a rule, fitted throughout, those on the 20-h.p. being 870 by 90 mm., on the 11-h.p. 750 by 85 mm., and on the 8-h.p. 700 by 85 mm.

Our readers have already had several opportunities for examining these well-built and carefully-designed vehicles, and they will be afforded another chance of doing so at the Show which opens to-day at the Agricultural Hall.



View of the 4-cylinder Engine on the 20-h.p. Talbot Car from the right side, showing the Automatic Carburettor, the Magneto, the Low-tension Igniters, and the neat ball-jointed Controlling Levers.

THE 16-20-H.P. 3-CYLINDER BELSIZE CAR.

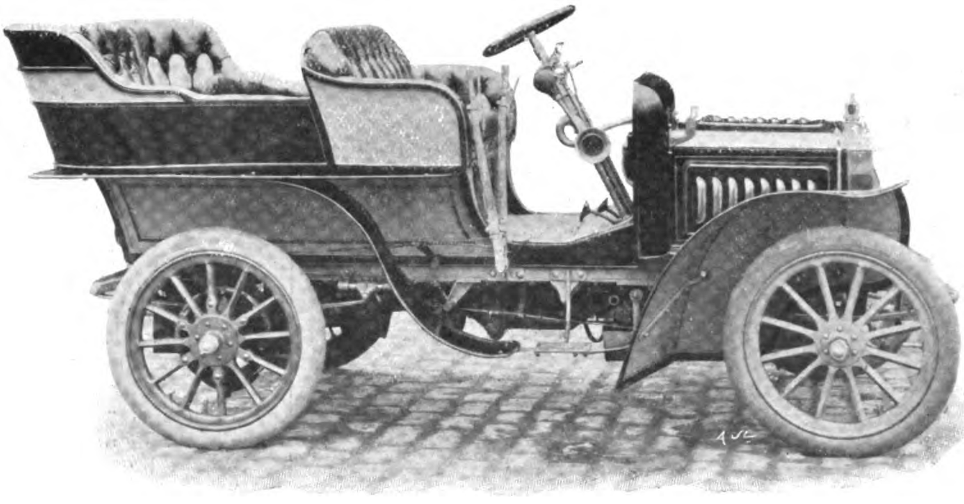


FIG. 1.—A 3-Cylinder Belsize Petrol Car.

THIS vehicle is one of the new models introduced this year by the Belsize Motor Car and Engineering Company of Manchester, and is in many respects very different from previous vehicles made by them. Its general appearance is seen in Fig. 1, and views of the chassis from either side are given in Figs. 2 and 3. It is of the live-axle type, has three speeds and a reverse, with direct drive on top-gear, and is of English construction throughout.

Both the main-frame and the under-frame, which supports the engine and the gear-box, are made of channel steel, and they are carried by semi-elliptic side-springs, the inner ends of which are connected to the frame by circular guides instead of by shackles. The rear springs form the sole direct connection between the axle and the frame, as no radius-rods of any kind are fitted.

The engine has each of its three cylinders cast separately, and all the valves are mounted vertically above them in such a manner that they can be completely removed, together with their seats. The inlet-valves are operated from the cam-shaft on the right side, and the exhaust-valves from a similar shaft on the left side, of the crank-chamber. The cam-shafts themselves are exposed, but the cams, and the gear-wheels driving them, are completely enclosed. This valve-operating mechanism consists of vertical push-rods and pivoted levers, which are so arranged that the latter can be easily removed from their normal positions for inspecting the valves. The cam-shaft which operates the inlet-valves is free to move longitudinally in its bearings, and the cams mounted upon it have a profile which varies in steps, so that the time at which the valves are allowed to close during the suction strokes of the engine is

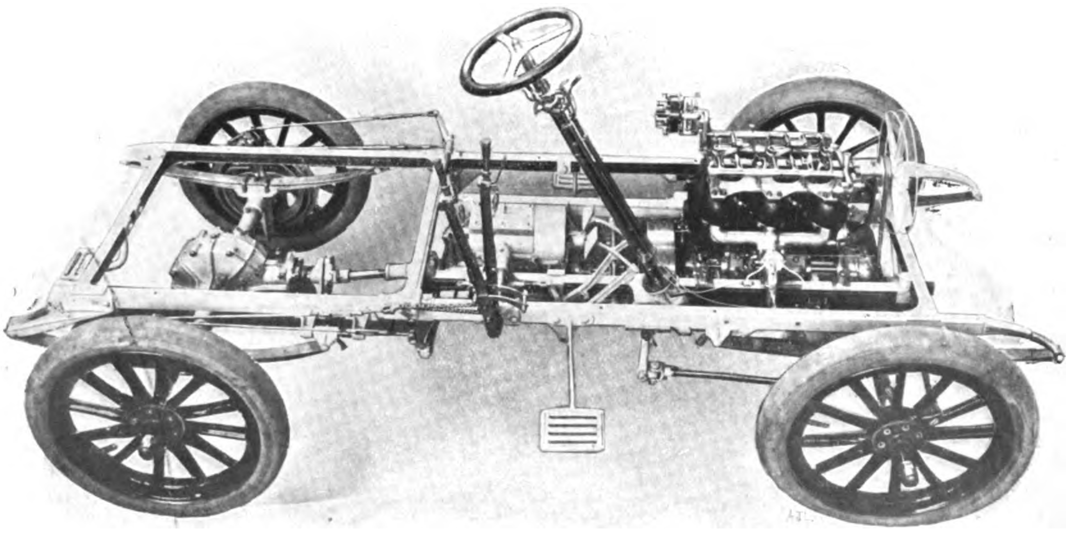


FIG. 2.—The 16-20-h.p. Belsize Chassis from the Right.

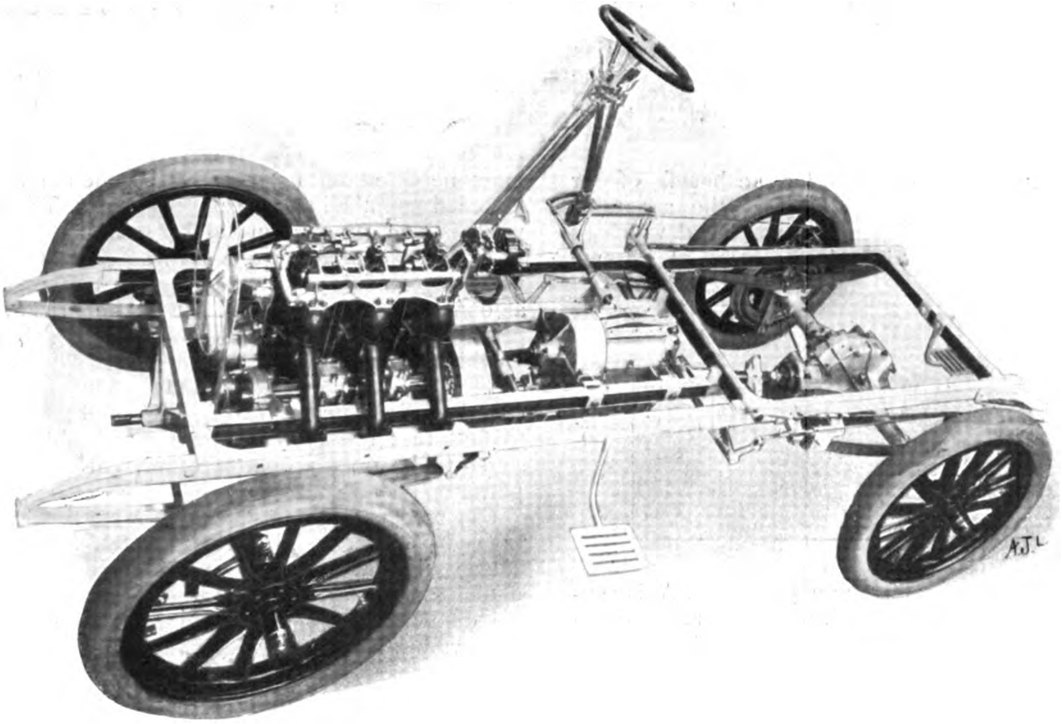


FIG. 3.—View of the 16-20-h.p. Belsize Chassis from the Left.

variable. The cam-shaft is for this purpose connected with a small hand-lever on the steering-pillar, and this enables the driver to vary the volume of the combustible charge, and therefore the power of the engine, irrespective of the throttle-valve.

A special form of throttle-valve is also introduced into the induction pipe, between the carburettor and the inlet-valves, and it has two concentric sleeves through ports in which the mixture can pass. One of these sleeves is controlled by a second hand-lever on the steering pillar, and the other is controlled by the centrifugal governor. In this manner the normal speed maintained by the governor can be varied by hand.

The crank-shaft, which is made of nickel steel, is a solid forging, and its crank-pins are drilled out, so that the big-end bearings of the connecting rod are lubricated from inside. The aluminium crank-chamber is made of two castings, and the bearings are so arranged that the lower portion can be removed without disturbing the crank-shaft. Either of the pistons can then be taken out, or, if it is necessary to remove the crank-shaft, this can be done without interfering with the upper casting or with the cylinders and their connections.

A high tension system of ignition is adopted, the plugs fitting into the inlet-valve chambers. A single trembler coil is employed, the chain-driven commutator on the dash also constituting a high tension distributor between the coil and the plugs. The contact-screw on the commutator is adjustable, and spark-gaps are formed inside the commutator for the high tension current.

The cooling water is circulated, by a gear-driven-pump of the eccentric type, through the jackets and through a honeycomb radiator mounted in front of the bonnet. Air is drawn through the radiator by a large belt-driven fan arranged behind.

The main-clutch is of the internal cone type, and a flexible coupling is introduced between it and the change-speed-gear. This gear gives a direct-through-drive on the top speed, and is so designed that none of the meshing gear-wheels in the box revolve when that speed is in use. The wheels are all very wide, and are fixed in such a way that any of them can be renewed separately. The lay-shaft lies immediately above the direct-through-shaft. All the bearings in the gear-box are of the plain type, as indeed they are throughout the whole of the transmission. The propeller-shaft, connecting the gear with the back-axle, has universal joints at either end, and the revolving shafts in the back-axle are made of nickel steel.

Both internal and external brakes are fitted to the hubs of the rear wheels, those acting on the outside of the drums being operated through a compensating chain by the hand-lever, and those which are fitted inside the drums are similarly compensated, and are applied by the foot-pedal. The external brakes are of the expanding type.

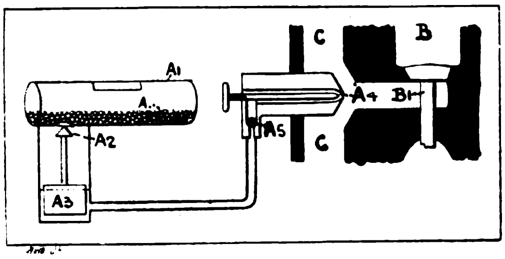
The steering gear is of the worm and segment type, and is irreversible. It, like all the other portions of the mechanism, is strongly constructed and has ample wearing surfaces.

FOR the first time this week a service of motor omnibuses has started running across Blackheath between the Brooke Hotel at Shooter's Hill and the Green Man, Blackheath Hill. Threepence is the fare charged for the whole journey.

A SILVER fox-skin rug, valued at £30, stolen from a motor car near the Comedy Theatre last week, is waiting for an owner at Bow Street Police Station. It appears that this was "annexed" by two youths, who were remanded by Sir Albert de Rutzen for unlawful possession.

THE CHENIER AND LION NAPHTHALINE CARBURETTOR.

In our issue of last week we referred (in connection with the French Fuel Consumption Trials) to the interesting exploit of Messrs. Chenier and Lion, who have been running an old type 2-cylinder Peugeot car some 60 kiloms. with naphthaline as fuel.



We are now able to illustrate for the benefit of our readers a diagrammatic illustration of the apparatus which Messrs. Chenier and Lion have employed, which, as will be seen, possesses at any rate the merit of extreme simplicity of arrangement. The naphthaline, A, is contained inside the receptacle, A^1, which corresponds to the petrol tank of an ordinary automobile. An enlarged mushroom valve, A^2, is mounted on the top of the vertical rod which terminates below in the float, A^3. It will be understood that the parts here shown are exhaust-jacketed, and the motor is in the first instance started with ordinary petrol until sufficient heat has been obtained to liquefy the lumps or balls of naphthaline as they fall down through the mushroom valve into the float-chamber below. When the melted naphthaline attains a certain level, the mushroom valve, A^2, is, of course, automatically closed, and prevents a further supply of balls of naphthaline from falling through. During the suction stroke the liquefied naphthaline is drawn through a spraying nozzle, A^4, situated immediately in front of the inlet-valve, the communication between the float-chamber and the jet being nominally closed by a ball-valve, which must be lifted off its seat by the suction before the liquefied naphthaline can pass to the jet. The degree of pulverisation can be adjusted by screwing the spraying nozzle nearer to or farther away from the inlet-valve, B^1, which opens into the compression-chamber, B. The amount of sprayed naphthaline fed into the cylinder is permanently adjusted by the needle-valve, the position of which is controlled by the milled nut shown.

The naphthaline liquefies in the exhaust-jacketed float chamber at a temperature of 79° C., and it is interesting to find that the cost of running with this material is stated to be only a quarter of what it is with ordinary petrol on a similar engine.

Our readers will remember that Messrs. Chenier and Lion also ran 100 kiloms. with Autun Shale oil. We understand that the arrangements adopted were similar to those made use of in the case of naphthaline, the difference being merely in the style of the mushroom valve which closes the connection between the oil tank and the float chamber.

The great economy in cost of fuel effected by the utilisation of naphthaline in this way cannot fail to confer a high degree of interest upon the arrangement adopted by Messrs. Chenier and Lion.

The most interesting feature is the apparatus for converting the naphthaline into a liquid. The actual means adopted, however, for spraying and mixing it with the air appears to be extremely crude, and is in many ways reminiscent of the earliest devices used for petrol.

MESSRS. CORDINGLEY AND CO.'S AGRICULTURAL HALL SHOW.

The exhibition, which opens to day (Saturday), is the ninth which has been held annually at the Agricultural Hall, and, so far as can be seen at present, it will be an unqualified success. Coming so soon after the Crystal Palace Show, and the Automobile Salon in Paris, the extent to which novelties may be expected is naturally somewhat limited, and, in fact, the majority of the up-to-date exhibits will be found to have been already made familiar to our readers in our columns during the past two or three months. Those, however, who have been unable to attend either of the two previous shows, will welcome this opportunity, and will doubtless take advantage of it, to make a personal examination of many of the new models, concerning which they cannot have failed to have heard some particulars. A further chance, too, will be given, for those who are interested, to again inspect many of the 1904 improvements, or to make themselves familiar with such of them as they may have been unable to give their attention to previously. It must, of course, be borne in mind that this Exhibition cannot be regarded as thoroughly representative of the entire industry, either so far as this country is concerned or in respect of the products of foreign makers, for there are quite a large number of leading firms who have voluntarily debarred themselves from taking part in it, and have done so in the hope of being able to limit the annual shows to one a year. It is almost unnecessary to mention that this Exhibition has the official patronage of the Automobile Club this year, for this fact cannot but be well-known to every motorist in the Kingdom, considering the recent controversy which it has aroused.

Heavy vehicles, and cars for commercial purposes, will be found to be an even stronger feature this year than before, and apparently in this respect, the exhibition will be superior to anything which has before been shown. Then, too, considerable interest is sure to be attracted by the aeronautical exhibits, this section being arranged by the Aero Club. Amongst new cars of English manufacture which will be brought before the public for the first time, the great novelty will probably be the Hutton car, which is constructed on very original lines throughout. It will be remembered that some of the engines were on view at the Crystal Palace, but that the promised chassis was not completed in time. The vehicle has a gradually variable change-speed mechanism, the control of which and of one pair of brakes is performed by a hydraulic system, in which thick oil is used as the medium. A four-cylinder Brooke car is another British vehicle to make its appearance for the first time, and in it, too, several interesting deviations from ordinary practice will be found. It has the maker's well-known chain type of gearing, but the engine is placed longitudinally, and the bevel gear is introduced between it and the first-motion-shaft, instead of between the second-motion-shaft and the differential countershaft. Messrs. Horsfall and Bickham are also bringing out a new model this year, and the Duryea Company expect to show a two-cylinder 8-h.p vehicle, which has been developed by them on similar general lines to their three-cylinder model; they will have, too, a new automatic carburettor. The Siddeley and the National Petrol Cars will again be on view, and amongst recent light vehicles of home manufacture there will be the Swift, Horley, Clyde and Alldays. The Putney Motor Company will make a special feature of a 16-h.p. brougham which has been designed and built by them for the use of commercial travellers. The Garard Manufacturing Company's new three-wheeled voiturette is likely to attract a good deal of attention, owing to its neat design; it has a 5.h.p. single-cylinder engine, a three-speed change-gear, and the back wheel is driven through a propeller-shaft by worm gearing.

Steam touring cars will be represented by the Cremorne Company, whose vehicle was described by us in November last, and by Messrs. Bailey and Lambert, the latter exhibiting Miesse cars, which have recently been improved by fitting them with a pilot lamp for keeping the generator hot when the car is standing.

Several well-known makers of petrol engines will be represented, many of the motors being applicable for launch work. The Putney Motor Company will show their Craig-Dorwald motors, and we may also mention those of Mr. F. C. Blake, the Forman Motor Company, and the Automobile Components (Automotor).

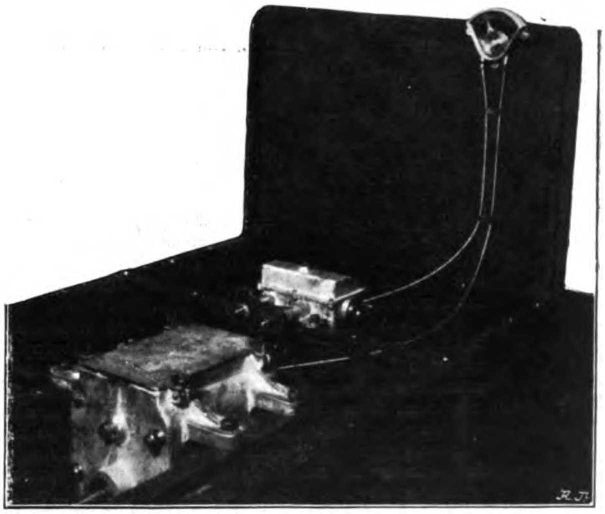
A special feature of Mr. Blake's stall will be a high-frequency trembler, which he is now fitting to his latest coils, in which a trembler blade is held at both ends, and the armature is attached to its centre at right angles.

Mr. W. H. Newman will show a very interesting apparatus which he has designed for use in conjunction with change-speed-gears of the sliding spur-wheel type on motor cars. This consists of an indicator which is fixed on the dash, and is controlled by two Bowden wires from mechanism beneath the floor. The indicator (illustrated below) enables the driver to know precisely the correct moment to introduce the new gear when changing from one speed to another, and thus reduces the risk of "missing" a gear or of damaging the gear wheels. He is also bringing out a novel universal joint which is adjustable for wear.

Many of the Continental builders will be represented by their respective agents, and it is interesting to notice that a few fresh cars of foreign origin will make their first appearance in this country. Thus we find that the Motobloc model, which we recently described, will be exhibited by Montague Hawnt and Co., the Tony Huber production, with which we have made our readers familiar in our Paris Salon reports, by the Paddington Motor Company; and there are also to be Hotchkiss and Barrè exhibits. The Diamant is one of the few entirely new names that we notice; these vehicles are being shown by the International Motor Car Company in two sizes—a 2-cylinder 12-h.p., and a 4-cylinder 24-h.p.

We learn that a few of those whose names appear amongst the list of exhibitors will for one reason or another be absent, thus it has been decided not to show the Elswick cars, since it has been found impossible to complete the British-built vehicles in time.

Attention has already been drawn by us to the Salvage Wagon shown above, this having been on view at the recent Crystal Palace Exhibition. It was built by the Durkopp Company for the Berlin Fire Brigade, but was undergoing tests by members of the London Fire Brigade when our photograph was taken.



To facilitate the changing of speed from one gear to another, Mr. W. H. Newman—whose variable speed gear we described last year—has invented the Indicator Apparatus illustrated above, which (as stated on this page) will be shown by him at the Agricultural Hall Show.

Both in New York and Chicago, as in London, there appears to be a growing impression that the automobile shows should be held at an earlier date than heretofore. Steps to this end have been taken by the N.A.A.M. executive, and if arrangements can be made it is hoped to put forward a proposition for the next New York Show to take place in either November or December, although the former month of this year, it is feared, will not be available at Madison Square Garden, and the latter will perforce therefore have to be chosen.

THE MOTOR CARS (USE AND CONSTRUCTION) ORDER, 1904.

THE following are the new regulations of the Local Government Board with respect to the use of Motor Cars on highways, and their construction, and the conditions under which they may be used. The old regulations made by the Board on November 9th, 1896, under the Motor Car Act, 1896, are rescinded, so far as those powers referred to the regulations issued under Sections 2, 6, and 7 of the Act of 1896:—

ARTICLE I.—In this Order—

The expression "carriage" includes a waggon, cart, or other vehicle.

The expression "horse" includes a mule or other beast of draught or burden, and the expression "cattle" includes sheep.

The expression "Motor Car" means a vehicle propelled by mechanical power which is under three tons in weight unladen, and is not used for the purpose of drawing more than one vehicle (such vehicle with its locomotive not exceeding in weight unladen four tons), and is so constructed that no smoke or visible vapour is emitted therefrom except from any temporary or accidental cause.

In calculating for the purposes of this Order the weight of a vehicle unladen, the weight of any water, fuel, or accumulators used for the purpose of propulsion shall not be included.

The expression "highway" includes any roadway to which the public are granted access.

ARTICLE II.—No person shall cause or permit a Motor Car to be used on any highway, or shall drive or have charge of a Motor Car when so used, unless the conditions hereinafter set forth are satisfied; namely:—

(1) The Motor Car, if it exceeds in weight unladen five hundredweight, shall be capable of being so worked that it may travel either forwards or backwards.

(2) The Motor Car shall not exceed seven feet two inches in width, such width to be measured between its extreme projecting points.

(3) The tire of each wheel of the Motor Car shall be smooth, and shall, where the same touches the ground, be flat and of the width following, namely:—

(*a*) If the weight of the Motor Car unladen exceeds fifteen hundredweight, but does not exceed one ton, not less than two and a half inches;

(*b*) If such weight exceeds one ton, but does not exceed two tons, not less than three inches;

(*c*) If such weight exceeds two tons, but does not exceed three tons, not less than four inches.

Provided that where a pneumatic tire or other tire of a soft or elastic material is used the conditions hereinbefore set forth with respect to tires shall not apply.

(4) The Motor Car shall have two independent brakes in good working order, and of such efficiency that the application of either to the Motor Car shall cause two of its wheels on the same axle to be so held that the wheels shall be effectually prevented from revolving, or shall have the same effect in stopping the Motor Car as if such wheels were so held.

Provided that in the case of a Motor Car having less than four wheels this condition shall apply as if, instead of two wheels on the same axle, one wheel was therein referred to.

(5) Where the weight of a Motor Car unladen exceeds fifteen hundredweight and the Motor Car is fitted with tires other than pneumatic tires or tires of a soft or elastic material, the weight of the Motor Car unladen shall be painted in one or more straight lines upon some conspicuous part of the right or off side of the Motor Car in large legible letters in white upon black or black upon white, not less than one inch in height.

(6) The Motor Car and all the fittings thereof shall be in such a condition as not to cause, or to be likely to cause, danger to any person on the Motor Car or on any highway.

(7)—(i.) The lamp to be carried attached to the Motor Car in pursuance of Section 2 of the Act of 1896 shall be so constructed and placed as to exhibit, during the period between one hour after sunset and one hour before sunrise, a white light visible within a reasonable distance in the direction towards which the Motor Car is proceeding or is intended to proceed, and to exhibit a red light so visible in the reverse direction. The lamp shall be placed on the extreme right or off side of the Motor Car in such a position as to be free from all obstruction to the light.

Provided that where a lamp, which exhibits a red light in the direction contrary to that towards which the Motor Car is proceeding, is carried attached at the back of the Motor Car, the condition requiring the lamp attached in pursuance of Section 2 of the Act of 1896 to exhibit a red light shall not apply or have effect with regard to the Motor Car.

Provided also that the first paragraph of this condition shall not extend to any bicycle, tricycle, or other machine to which Section 85 of the Local Government Act, 1888, applies.

(ii.) Every lamp carried by the Motor Car when in use on a highway at any time during the period mentioned in this condition shall be so constructed, fitted, and attached as to prevent the movement or the use as a searchlight of the light exhibited by any such lamp.

ARTICLE III.—No person shall cause or permit a Motor Car to be used on any highway for the purpose of drawing any vehicle, or shall drive or have charge of a Motor Car when used for such purpose unless the conditions hereinafter set forth are satisfied, namely:—

(1) Conditions (2), (3), (5), and (6) of Article II. of this Order shall apply as if the vehicle drawn by the Motor Car was therein referred to instead of the Motor Car itself.

(2) Every vehicle exceeding two hundredweight in weight unladen, drawn by a Motor Car, shall have a brake in good working order of such efficiency that its application to the vehicle shall cause two of the wheels of the vehicle on the same axle to be so held that the wheels shall be effectually prevented from revolving, or shall have the same effect in stopping the vehicle as if such wheels were so held.

(3) The vehicle drawn by a Motor Car shall, when in pursuance of the condition lastly hereinbefore set forth a brake is required to be attached thereto, carry upon the vehicle a person competent to apply efficiently the brake. Provided that it shall not be necessary to comply with this condition if the brakes upon the Motor Car by which the vehicle is drawn are so constructed and arranged that neither of such brakes can be used without bringing into action simultaneously the brake attached to the vehicle drawn, or if the brake of the vehicle drawn can be applied from the Motor Car by a person upon the Motor Car independently of the brakes of the latter.

ARTICLE IV.—Every person driving or in charge of a Motor Car when used on any highway shall comply with the Regulations ereinafter set forth, namely:—

(1) He shall not cause the Motor Car to travel backwards for a greater distance or time than may be requisite for the safety or convenience of the occupants of the Motor Car and of the passenger and other traffic on the highway.

(2) He shall not, when on the Motor Car, be in such a position that he cannot have control over the same, or that he cannot obtain a full view of the road and traffic ahead of the Motor Car, or quit the Motor Car without having taken due precautions against its being started in his absence, or allow the Motor Car or a vehicle drawn thereby to stand on such highway so as to cause any unnecessary obstruction thereof.

(3) He shall, when meeting any carriage, horse, or cattle, keep the Motor Car on the left or near side of the road, and when passing any carriage, horse, or cattle proceeding in the same direction, keep the Motor Car on the right or off side of the same.

(4) He shall not negligently or wilfully prevent, hinder, or interrupt the free passage of any person, carriage, horse, or cattle on any highway, and shall keep the Motor Car and any vehicle drawn thereby on the left or near side of the road for the purpose of allowing such passage.

(5) He shall, whenever necessary, by sounding the bell or other instrument required by Section 3 of the Act of 1896, give audible and sufficient warning of the approach or position of the Motor Car.

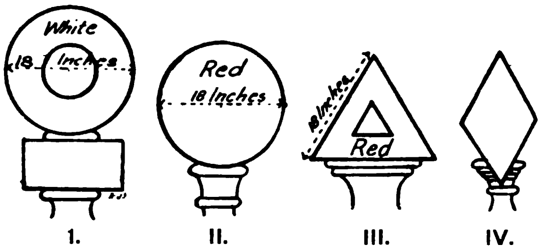
(6) He shall on the request of any police constable in uniform, or of any person having charge of a horse, or if any such constable or person shall put up his hand as a signal for that purpose, cause the Motor Car to stop and remain stationary so long as may be reasonably necessary.

Article V.—Every Motor Car shall be so constructed as to enable the driver, when the Motor Car is stationary otherwise than through an enforced stoppage owing to necessities of traffic, to stop the action of any machinery attached to, or forming part of the Motor Car, so far as may be necessary for the prevention of noise. The driver shall on every such occasion make prompt and effective use of all such means as, in pursuance of this condition, are provided for the prevention of noise as above-mentioned.

Provided that this regulation shall not apply so as to prevent the examination or working of the machinery attached to, or forming part of a Motor Car where any such operation is rendered necessary by any failure or derangement of the said machinery.

This Order may be cited as "The Motor Cars (Use and Construction) Order, 1904."

Appendix.—Recommendation for notices and sign posts under Section 10 of the Motor Car Act, 1903, adopted by the County Councils Association and the Municipal Corporations Association:—

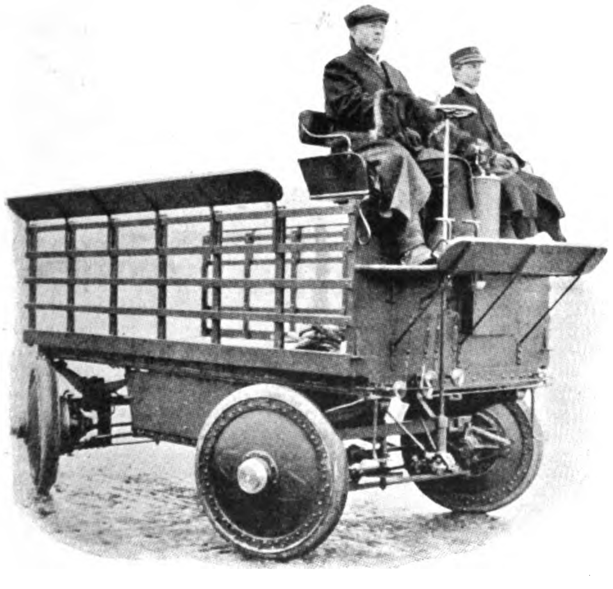


I. For ten mile or lower limit of speed, a white ring, 18 inches in diameter, with plate below, giving the limit in figures.
II. For prohibition, a solid red disc, 18 inches in diameter.
III. For caution (dangerous corners, cross roads, or precipitous places), a hollow red equilateral triangle, with 18-inch sides.
IV. All other notices under the Act to be on diamond-shaped boards.

That all such notices be placed on the near side of the road, facing the approaching driver.

That all notices under Section 10 (2) of the Act be fixed at about 50 yards from the spot to which they apply.

That the under-side of the sign be not less than 8 feet from the ground level.



One of the novelties at the recent Chicago Automobile Exhibition is shown above. It is an electric truck for commercial work, and has 2-h.p. motors fitted inside each of the four wheels. Similar motor wheels have been constructed formerly, and some of these—notably the Lohner-Porsche—have been described in our columns. In the present case, pinions are fitted at both ends of each armature shaft, both of them being connected by gearing with the road wheel. Not only are all four wheels "drivers," but they are all so arranged as to act as steering wheels as well—thus enabling the vehicle to turn in a very small space.

REVIEWS OF BOOKS.

"The Little Guides—Rome." By C. G. Ellaby. London: Methuen and Co.

All the little guides which we have reviewed have been excellent to a certain degree, but the present one, dealing with Rome, from the guide book point of view is the most ambitious of any of them. The antiquarian interest of Rome is, of course, infinite, and no one could possibly deal adequately with the subject in a single small volume. Nevertheless, Mr. Ellaby, in this little book, succeeds in giving us in a wonderfully vivid and succinct manner the general outline both of the principal remains of the "Niobe of nations," while he summarises with great ability the principal results of modern archæological research. The classical remains of Rome are naturally the more elaborately treated, and everybody will feel that they possess a higher interest than those of the mediæval city which are dealt with more succinctly. "All roads lead to Rome," and sooner or later most automobilists will find themselves there. When they do, we can thoroughly recommend Mr. Ellaby's little book as an introduction to the study of the city.

"Die Photographische Kunst-im Jahre, 1903." (W. Knapp, Halle-a-Saale, Germany.)

This book is a collection of what may really be called *tours de force* in the way of photographs. It consists of a large number of illustrations showing the marvellous way in which various photographic processes can, by judicious manipulation, be caused to resemble very closely some of the best work of the etcher. More than one of the illustrations would at first sight pass for a Rembrandt copper etching. The illustrations are not confined to this particular department, however, but show in a variety of ways the numerous artistic effects that can be obtained by a little judicious treatment of the negative. The illustrations are accompanied by a number of brightly written descriptions of various processes.

Gas and Oil Engine Management, by M. P. Bale, M. I. Mech. E. London: Crosby, Lockwood, and Company.

This is an excellent little handbook giving in short compass, and with much perspicuity, the leading principles of gas engines, including electric ignition. It should prove of service to all manufacturers or private owners who have gas engines on their works or estates, and will prove an excellent introductory work for those who desire to study the principles of explosion engines with a view to familiarising themselves subsequently with the petrol engine as employed on motor vehicles.

"The Englishwoman's Year Book and Directory, 1904." Edited by Emily Janes. London: A. and C. Black. (2*s*. 6*d*.)

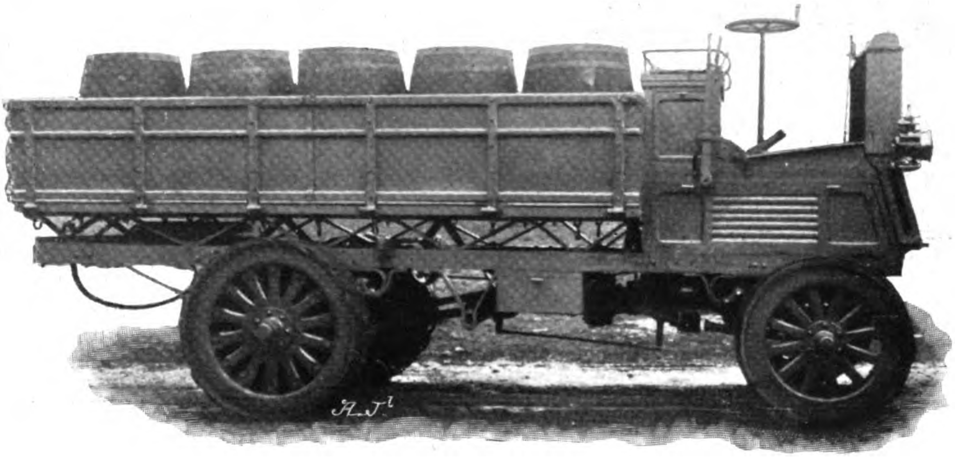
This is the 6th annual issue of this useful publication, which is specially designed to afford information to all women seeking to earn their own living, and includes an extensive list of all the institutions and societies in which women are interested. The work contains an enormous amount of useful information.

CLUB DOINGS.

A.C.G.B.I.—An analysis of the voting for the new club committee demonstrates that with the exception of the 367 supporters of both Lord Shrewsbury's and Mr. Wallace's list of candidates, the members were solid in voting for the list of members put forward by Mr. Scott Montagu and his co-workers. 954 voting papers were returned in all, of which 56 were rejected for various technical irregularities. The largest number of votes, viz., 866, were polled by Lt.-Col. Holden, and the lowest number was 517. A curious fact, however, is shown by the number of votes recorded to each candidate, that down to the end of the list of candidates elected, who were put forward both in Mr. Scott Montagu's list and that of the opposition, the total number of votes varied very slightly, and it was only when the names were reached of those who were solely on Mr. Scott Montagu's list that the numbers dropped.

The votes of the supporters of the old régime represented mainly by the signers of the "opposition" proxies, naturally told against the names put forward by Mr. Scott Montagu, but a significant fact emerged when, in answer to a query, as to whether the 56 rejected votes if examined further and brought into the counting might alter the election, it was unhesitatingly stated by the scrutineers that the whole 56, if counted, would not vary the list of names. Had the number of votes obtained by the rest of the candidates been published possibly the result might have been even more convincing.

Berkshire Automobile Club.—Sir Gilbert A. Clayton East, Bart. (chairman), presided last Saturday at a general meeting of members of this newly-formed club, when the leading members interested in the movement in the district were present. Mr. Carew-Gibson was appointed to the committee in place of Sir Alexander Henderson, who had been unfortunately unable to act. Club rules were submitted and considered, and with slight alterations unanimously adopted, one being a particularly drastic one empowering the committee to deal in an effectual manner with any gross cases of misbehaviour likely to bring discredit either on the club or on automobilism generally. Dr. Norman Joy and Mr. C. R. De la Salle were proposed as members of the Sports Committee to co-opt with others to be appointed from the general committee of the club. A number of suggestions were put forward in regard to arrangements of meets, drives and sports for the coming season. The opening event will take place at the invitation of the chairman, Sir Gilbert East, on the Saturday in Whitsun week, May 28th, at Hill Place, and will take the form of a gymkhana, following which meets or other fixtures will be held at different places on the last Saturday and second Wednesday in each month, except August, up to and including September. For the opening sports suggestions were made for organising a hill-climbing test, a speed-judging contest (without watch or speedometer), a "starting and stopping" race, and also a slow race for motor bicycles. The membership of the club already numbers 71.



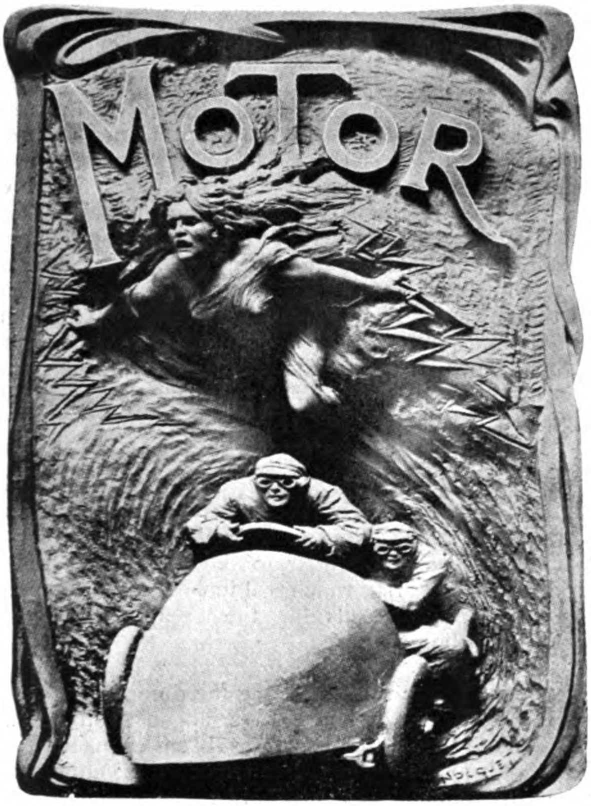
The War Office, which continues its experiments with motor lurries for Military purposes, has been supervising some lengthened tests with 24-h.p. wagons built by Messrs. Stirling's Motor Carriage Works at Granton, near Edinburgh. The tests have proved, we understand, thoroughly satisfactory, and the Department has accordingly purchased two of the 24-h.p. motor lurries. The lurries are to be run to London by road at an early date. The War Office officials had been specially satisfied with the efficient manner in which the winding gear of the lurries enabled them to extricate themselves from quagmires in which, without that assistance, they would have been hopelessly imbedded. One of these machines loaded as in the Trials is shown in the photograph we reproduce.

Continental Touring.—Mr. Roger H. Fuller read a very interesting paper on this subject at the Automobile Club last week, in which his experiences in a preliminary run over the greater portion of the Paris-Madrid course were described in a light, chatty, and attractive manner. Mr. Fuller derived the greatest possible advantage from the *Permis* for foreign travel which he obtained at the Automobile Club before starting. This forms a passport which is recognised in all European countries, and saves apparently an enormous amount of trouble and bother to the tourist. Mr. Fuller gave useful information in regard to the different routes for reaching the Continent, and discussed the rival merits of (1) the Dover-Calais route; (2) the Folkestone-Boulogne route; (3) the Newhaven-Dieppe route; and (4) the Southampton-Havre route. Of these the last is somewhat less costly than the other three, and Mr. Fuller prefers it, as the hours are more convenient, and, of course, it must be remembered that the road from Havre is the more attractive. Mr. Fuller found that touring in France costs about the same as in England, the cost of petrol being practically the same, that is to say, you get about two litres for a franc. But it is interesting to find that the wear on tyres is greater owing to the increased speed at which one is allowed to drive, and the extent to which the much better roads prompt one to do so. Mr. Fuller's experience is that the "Annuaire de Route," sold by Taride and Co., 18, Boul. St. Denis, Paris, is thoroughly reliable in regard to hotels. Mr. Fuller concludes that "Touring in France is three times as easy as in England. Essence, electricity, and tyres of all makes are to be had in the towns of any size. Maps and signposts, and a little observation on your part, will take you anywhere."

Eastern Counties Automobile Club.—The chief club runs for the 1904 season have now been in the main arranged, and are as follows:—May 28th, Ipswich to Felixstowe (Felix Hotel); June 11th, Stowmarket Market Place to Bury St. Edmunds (Angel Hotel); June 25th, Manningtree Railway Station to Clacton-on-Sea (Grand Hotel); July 9th, Debenham to Framlingham (The Crown); July 23rd, Stoke-by-Nayland to Sudbury; August 13th, Colchester to Cups Hotel; September 3rd, Wickham Market to Woodbridge (Bull Hotel). With the exception of June 11th, when the start is 2.30, the meet on each day is at 3 p.m.

Herefordshire Automobile Club.—Owing to the phenomenally bad weather on March 5th, the opening run of the season had to be postponed until last Saturday, the 12th, when, possibly owing to the change of date, only a limited number of members were able to take part in the outing. Abergavenny was selected for the afternoon's run, where tea was served at the Angel Hotel. In striking contrast to the previous Saturday, the weather was exquisitely fine and Hereford was again reached about 7.30 p.m.

Lincolnshire Automobile Club.—A general meeting of the members of this club was held at headquarters—the Saracen's Head, Lincoln—on March 11th. Sir Hickman Bacon, Bart., the president, was in the chair, and about thirty other members were present from all parts of the county. It was formally decided to



Each month *The Motor* (U.S.A.) alters the style of its front cover. The above is a reproduction of the clever design which appears on the March issue.

adopt Scheme 2 for affiliation with the Motor Union. A long discussion took place with regard to the alteration of some of the club rules, but nothing was decided upon. A programme of fixtures for the ensuing season was before the meeting for approval. The list, which is longer than last year, will average about two runs a month, and the opening meet is to take place on Saturday, April 9th, at the Shades, Spilsby. Several influential county gentlemen will entertain the club during the summer, and there will be a series of hill-climbing contests, speed, and steering competitions. The programme is a very attractive one, and a list will be published as soon as it has been finally settled.

Society of Motor Manufacturers and Traders.—The list of members in this society is growing in numbers steadily, and now practically comprises the whole of the important firms in the automobile industry. Amongst the latest who were elected to membership last week are: Keene's Automobile Company, the Anglian Motor Car Company, De Dietrich and Co., Olds Motor Works, W. H Wilcox and Co., Limited, J. A. Lawton and Co., John I. Thornycroft and Co., Ltd., Swift Motor Company, Ltd., Price's Patent Candle Company, G. T. Riches and Co., and the North British Rubber Company.

At the same meeting of the society a number of important matters were dealt with, including the question of ballot for spaces at the 1905 Exhibition, the authorisation of a contribution of 25 guineas to the Motor Wagon Parade on May-Day, and also a contribution towards the expenses of an appeal in connection with the magistrate's decision in the Rollet case, which has created so much indignation amongst automobilists. It was annonnced that the society now had 55 bond-holders, who had undertaken to show at no other exhibition except that of the society, and that applications had already been received for 105,000 square feet of space for 1905. Altogether the prospects for next year's Show appear to promise greater success than even the one recently closed, at which 145,000 visitors attended.

Wolverhampton Automobile Club.—Failing to arrange satisfactory terms with the Victoria Hotel Co. for increased and improved accommodation at headquarters, the club have now determined to take premises for themselves in the New London Buildings, Lichfield Street, Wolverhampton. These have been secured for a term of years and are to be immediately furnished, including the provision of a billiard table, etc. For garage purposes the Victoria Hotel yard will, as at present, be used by members. The present membership of the club is eighty-eight, and to enable the new arrangement to be satisfactorily carried out it is proposed to raise the annual subscription to two guineas, while certain members have already come forward and joined in a guarantee fund to enable the whole scheme to be carried through at once. At the annual general meeting of the club the following officers and members of the committee were appointed:—

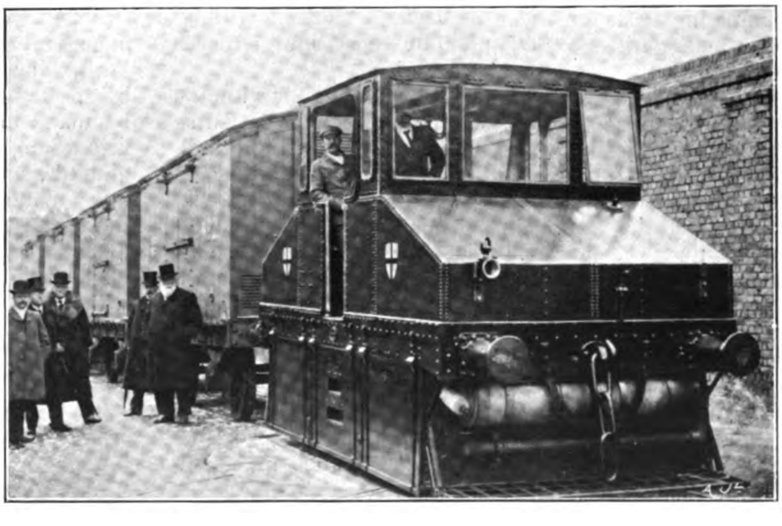
President, Mr. J. Osmond Evans. Vice-Presidents, Alderman Levi Johnson (Mayor); Sir Alfred Hickman, Bart., M.P.; Mr. Henry Norman, M.P.; Captain Burnett (Chief Constable, Wolverhampton); Mr. J. H. Cooksey (Town Clerk, Bridgnorth); Mr. Edward Lisle; Mr. W. Owen.

Committee, Messrs. F. C. Bishop, T. Cureton, G. Evans, W. H. Evans, H. W. Jenks, T. Lisle, T. Mills, T. Young.

Hon. Treasurer, Mr. A. E. Jenks; Hon. Secretary, Mr. S. R. Rhodes.

It was resolved for the present not to affiliate with the A.C.G.B.I., but to devote the amount which would be necessary for that purpose towards furthering the interests of automobilism locally.

THE Auto-Cycle Club have decided to have their next paper on "Some Suggestions for the 1,000 Miles Motor Cycle Trials," by Mr. Victor Hart, read before a meeting of the members to be held during the Show at the Agricultural Hall on Friday, March 25th, at 7 p.m. Tickets including admission will be posted to all members.



This interesting, and apparently very successful, petrol locomotive has recently been built by the Maudslay Motor Company, to the order of the City of London Corporation, for drawing trucks between the Corporation Meat Market and the sidings of the L.B. and S.C. Ry. Co. It is designed to haul four trucks, weighing 50 tons loaded, and a gradient of 1 in 36 has to be ascended. The 3-cylinder engine develops 80-b.h.p. at 450 revs. per min., and a single-cylinder 8-h.p. auxiliary engine is provided for starting it. The cylinders have a bore of 9 in., and the stroke is 9 in. The change-speed-gear gives two speeds—2½ and 5 miles per hour respectively—in each direction. As will be seen, the entire mechanism is covered in to conform with Board of Trade regulations. The locomotive weighs about 12 tons, and is fitted with Westinghouse, as well as hand, brakes.

RACES, RECORDS, AND TRIALS.

GORDON-BENNETT ITEMS.

The Bill for enabling the British Eliminating Trials to be held in the Isle of Man passed the Manx Legislature on Tuesday, having first been discussed in the Legislative Council, and then passed in the House of Keys. The only provision that the Manx Legislature has inserted is the prohibition of races on Sunday, and the Bill having been signed will, in all probability, receive the Royal assent at an early date. The facility with which the measure has been passed is one more illustration of the advantages of the complete home rule which the Isle of Man enjoys. The Manx Legislature has generously left the question of defraying the expense involved an open one, having refused to compel the promoters of the race to be responsible for it.

No undue advantage is to be taken by the Germans of the race being run in their country, to familiarise unfairly their own representatives with the course. The Bürgermeister of Homburg has in an interview stated that arrangements for competitors of whatever nationality to travel over the course beforehand will be made. The circuit will be opened for "practice" a month before the actual race, and during a portion of each day—11 a.m. to 3 p.m.—precautions will be taken to close side roads to traffic, so that the chance of accidents may be reduced to a minimum. The expenses will be apportioned amongst the firms whose cars take part. Any reckless driving through inhabited parts of the course will be visited by prohibition of the use of the circuit, and strong efforts to stop the vehicles of the particular firm from taking part in the races.

Madame du Gast has published a strong letter of protest in respect to the French clubs ruling that no ladies will be permitted to drive cars either in the eliminating trials or the race itself. But the ruling nevertheless will be applauded by most unprejudiced persons.

The "caravan" being arranged by *L'Auto* for witnessing the race and fêtes will start on June 12th from Paris, and arrive near the course viâ Nancy, Strasburg and Heidelberg on June 14th. The various events will be then witnessed, and the return started on June 20th viâ Luxemburg, the "caravan" disbanding upon reaching the frontier the next day. The headquarters will be at Wiesbaden and Mainz, about 14 and 30 kiloms. respectively from the course. The inclusive cost will be about £16 to £18. *L'Auto* also propose arranging for a "popular" tour by train.

Results of the 500 metre hill speed trials at Marseilles, held on March 6th under the patronage of the A.C. of Marseilles, have been issued. The winners in the various categories are :—

A (*less than* 5-*h.p.*), 4½-h.p. Peugeot (Time, 1 min. 36⅘ secs.). **B** (5–8-*h.p.*), 6-h.p. Cottereau (1 min. 24⅕ secs.). **C** (8–15-*h.p.*), 12-h.p. Rochet-Schneider (1 min. 10⅘ secs.). **D** (15–24-*h.p.*), 20-h.p. Rochet-Schneider (50⅕ secs.). **E** (*motor bicycles under* 2½-*h.p.*), 2½-h.p. Griffon (50⅘ secs.). **F** (*over* 2½-*h.p.*), 3½-h.p. Peugeot (44 secs.).

The Automobile Club Side-Slip Trials will be started on Monday, the 18th April, with a 1,000 Miles Endurance Test. After this Endurance Test the Side-Slip Trials will be held on the track of the new Clement Talbot Works, near Ladbroke Grove.

1,000 Miles Reliability Trial.—Owing to the mistake of one of the observers on this Trial, who was not acquainted with Westerham Hill, a wrong entry was made in the observer's notebook to the effect that No. 106, a 24-h.p. Georges-Richard car, stopped on Westerham Hill, whereas, as a matter of fact, the car stopped on another hill, for some slight cause, before arriving at this test hill. It has, therefore, been officially notified that this car has been entered for a non-stop climb on Westerham, as also No. 57, a 12-h.p. Georges-Richard car, both of which were entered by Messrs. Mann and Overton, Limited, of the Victoria Garage, 7a, Lower Belgrave Street, S.W.

A 400-kilometre test, termed the Circuit du Pas de Calais, is being organised in connection with the Arras Exhibition in May. This event will be open only to small vehicles weighing under 400 kilogs. and to motor bicycles. In this trial, which will include hill and speed tests, no average speeds for the entire run beyond 30 k.p.h. will be recognised.

The date for the run for testing the durability of anti-skid devices, which it has been arranged shall be run from Paris to Nice and back, has been changed from March 25th to the 30th, on which day the competitors will start from Paris. A stay will be made at Nice and Monte Carlo from April 4th to 7th, the return journey being started on April 8th. The organisers propose photographing all the devices as they are on the cars after the finish at Paris, copies being supplied to each of the competitors.

An ambitious project in France for the building of a huge motodrome at Sartrouville, within easy access of Paris, which will give a racing course of 7·3 kiloms. long by 40 metres wide for motor cars. Provision will also be made in connection with the scheme for a huge velodrome, 3 kiloms. in circumference, extensive polo grounds, special enclosures for football, ballooning, and every manner of sport. M. Rejaumier is the author of the project, and in the statement published by him the financial aspect is dealt with in such a manner that it is claimed the majority of the cost of the whole installation will be recouped by the sale of the surplus land, for other

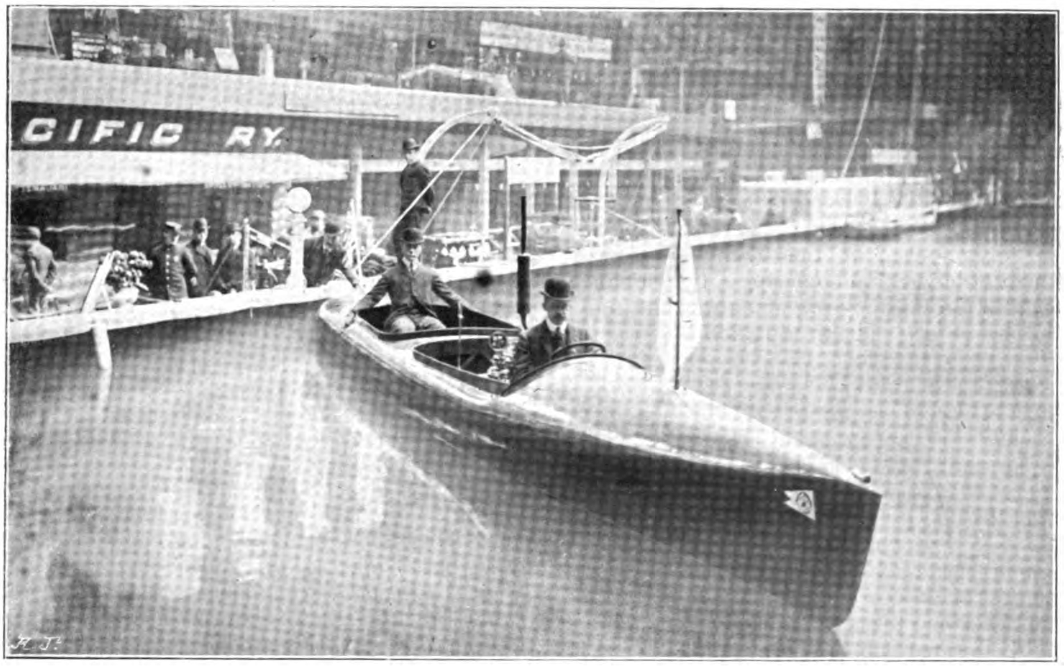
The Chauffeur: "Yep, it's a two-coon power machine, but one of 'em's sick terday."—*The Motor, U.S.A.*

purposes, which will not be actually required for sports and racing. In addition, a double quay for motor boats is to be provided on the Seine, which the grounds adjoin, and the actual racing track will be surrounded by a turfed bank in such a way as to prevent the public invading the course.

SEVERAL times propositions have been put forward for the creation of a motodrome in the Bois de Boulogne, Paris, but so far they have all ended in smoke. A renewed and what appears to be a serious application has now been made to the authorities for sanction to construct a motodrome at Bagatelle. In seeking to obtain a concession it is suggested that an arrangement should be made for 3, 6, and 9 years, and provision is made for the proper admission of the public at all times, with the exception of certain days, which would be reserved for special events of importance. It is claimed that not only will the construction of this motodrome not interfere with the general rights of the public, but will tend rather to improve the Bois, and should, if worked properly by the municipal authorities in conjunction with the concessionaires, prove of considerable value by bringing in an appreciable income to the municipal coffers of Paris.

THE new Racing Board of the American Automobile Association has now been appointed. Amongst a section of the prominent automobilists in America it was hoped to place Mr. W. K. Vanderbilt, jun., in the chair, but at the final meeting for the election Mr. A. R. Pardington was again elected to the position, the rest of the members of the Board being Messrs. William K. Vanderbilt, jun., O. W. Bright, S. M. Butler, W. Wallace, G. L. Weiss, and F. C. Donald. In addition, two technical advisers have been appointed, viz., A. L. Riker, to represent American-made cars, and E. T. Birdsall, to look after the interests of the imported racers. The question of the Association assuming the control of motor boat racing was considered, and a committee appointed to go into the whole question with the Power Boat Association, in order that the two bodies' interests may not clash. It is a little significant, however, that already the A.A.A. have arranged for the drawing up of racing rules and a table of displacements and allowances by two experts, H. L. Towle being appointed for motors, and Lieut. C. H. Hall on the question of hulls.

THE Auto-Cycle Club have officially informed us that they have decided to regard the use of silencers in track races in future as optional, owing, it is stated, to the difficulty of deciding what an efficient silencer is. Frankly, we must admit we are sorry for this decision. We have always been opposed to the use of inadequate silencers, and, of course, even more opposed to their omission. Sufficient annoyance to the public is already caused by such inadequate silencers on motor cycles as used on roads, and the irritation that is frequently expressed by the noise they create is certainly not benefiting the automobile movement generally. If silencers are to be abandoned altogether on auto-cycle race tracks the hostility of householders within a radius of half a mile will be considerable, for it will be as pleasant for them as if they were located near the Maxim gun trial range at Erith. Instruments have been devised for measuring the intensity of sound, and such instruments could be in all probability adapted to adequately compare the merits of different exhaust-boxes. The Auto-Cycle Club would be deserving much better of mankind generally, and the industry in particular, if it would face the problem in some such way as this, and offer some encouragement to inventors to come forward with a device for comparing silencers instead of officially encouraging the use of motor cycles with silencers removed.



MOTOR BOATS AT THE NEW YORK SPORTSMAN'S EXHIBITION.—The F.I.A.T. Speed Boat in the Tank with Messrs. Hollander and Tangeman on board.

Mr. Bernard Hopps' name was spelled last week as Hobbs, in our mention of his Paper on "Notes on Automobiles," which he read before the Rugby Engineering Society. Mr. Hopps is associated with the British Thomson Houston Company, Limited.

In the report of Vickers, Sons and Maxim, Ltd., submitted at the general meeting on Wednesday this week, the directors notified that their favourable expectations in regard to the Wolseley Tool and Motor Car Company's progress have been completely fulfilled, and that the large demand for these cars continued steadily.

One by one the various local authorities who, in the heat of the moment, soon after the Local Government Board Regulations were issued, petitioned to restrict the speed of motor cars in their districts to 10 miles per hour, are withdrawing their applications, as time has given a chance for more mature consideration. The latest to notify their withdrawal is the Borough of Blackpool, and we shall hope to record shortly others following suit.

We are all accustomed to the warranty given with a horse that it is "quiet to ride and drive." There has been a general attempt, however, to maintain that this does not include the case of a horse being confronted by a motor vehicle. We are glad, therefore, to find that another Judge—viz., at the Lambeth County Court—has held otherwise, and considers that a horse is not quiet within the meaning of such a warranty if he exhibits symptoms of terror at the approach of an automobile.

Sir Walter Gilbey, speaking as President at a meeting of the Hunters' Improvement Society last week, lamented the downward course of horse-breeding in this country, and said it was very disheartening to see the figures relating to the importation of foreign horses into England. Although he considered that more horses would be seen in Hyde Park during the next ten years than ever had been seen before, and although he thought the motor car had come to stay, he did not think there would be any rivalry between the two.

No. 1 of the *Motor Volunteer Gazette*, a neat little publication, is to hand. The form in which it is got up should render it popular amongst all members of the corps, and its regular distribution each month must tend to promote good feeling amongst the members, and keep them thoroughly in touch with all the necessary information required of the doings of the various commands. The editorial introduction is both modest and straightforward. It claims that it does not purport to be in any sense of the word a newspaper or public journal, and only desires to be regarded as a private publication for the convenience of the members of the corps alone, at the same time acting as a medium whereby the members may become better acquainted with each other and the works, aims and ambitions of the corps itself. The annual subscription is five shillings, which, however, is entirely voluntary. The *Gazette* will appear once a month. In the first number a supplement is published giving the names and addresses of all officers and members of the corps, the primary object of this being that in the event of a member having a breakdown on the road, he may readily be able to obtain the help of a comrade in whose vicinity he may happen to be at the time.

An interesting ride was made last Saturday by Mr. G. H. Smith on a 2¾-h.p. Werner tricycle. He accompanied the Motor Cycling Club on a run to Brighton, using paraffin as fuel and employing the smallest sized Cremorne carburettor. Unfortunately about 3½ miles from Brighton the paraffin was exhausted, and the journey had to be finished on petrol. The tank on the machine holds something under a gallon, and Mr. Smith draws special attention to the fact that he was able to run on paraffin a further distance than he could have accomplished on the same quantity of petrol.

Messrs. Ridgways, Limited, recently acquired a Cadillac delivery van, and before finally deciding to adopt this method for rapid delivery the firm determined to put it through a test under actual working conditions. During the week under which it was on trial the van travelled 310 miles, carrying a load of 7 cwt. It made 545 stops for delivery of goods, during the whole of the time not the smallest hitch of any kind occurring to the vehicle. Needless to say Messrs. Ridgways have not therefore hesitated to adopt the system for the future. We understand that not only have the Anglo-American Motor Car Company, the agents for the cars on this side of the Atlantic, sold out their entire stock, but they have already disposed of the next two consignments due for delivery from America.

At Lyons a company with a large capital proposes to open up six automobile routes both for passengers and goods service. The various main points, with Lyons as a centre, to be served are Grenoble (48 districts), 116 kiloms.; Annonay (36 districts), 90 kiloms.; St. Etienne (30 districts), 62 kiloms.; Macon (33 districts), 72 kiloms.; Roanne (36 districts), 92 kiloms.; and Bourg (37 districts), 65 kiloms.

The National Automobile Association of America have decided not to hold an endurance contest this year, but to officially recognise the big national run of the American Automobile Association to St. Louis. They will specially urge all the members of their society to join in making this run a big success. The combined parade in the St. Louis Fair Grounds will take place on August 10th, the start from New York being made on July 26th.

The 14-h.p. Gladiator car is, no doubt as our readers are aware, a 4-cylinder car. In Messrs. S. F. Edge, Limited's advertisement last week it was wrongly announced to have two cylinders only.

Mr. J. S. Critchley has recently taken over the Stanley Works, 306, King's Road, Chelsea, S.W. These works, which are equipped with an excellent set of machine tools, are suitable for any kind of motor car repair work. Mr. Critchley has arranged for a good staff of skilled men, and is therefore able to carry out any work either in the shape of repairs or alterations. He proposes to make a special provision for experimental work on a considerable scale.

LAW REPORTS.

Piccadilly Motor Company (Limited).—In the Chancery Division on Saturday, Mr. Justice Byrne had before him the action of Munday *v.* The Piccadilly Motor Company (Limited), which came on as a motion for judgment. The plaintiff lent £500 to the Company, and took a debenture which was a charge on the whole of the property of the Company including the uncalled capital. Interest had not been paid, and an execution had been levied by a creditor which entitled the plaintiff to call in his principal. Mr. Ford appeared for the plaintiff, and there was no defence. Mr. Justice Byrne gave judgment for the plaintiff, and directed the usual accounts and inquiries to be taken.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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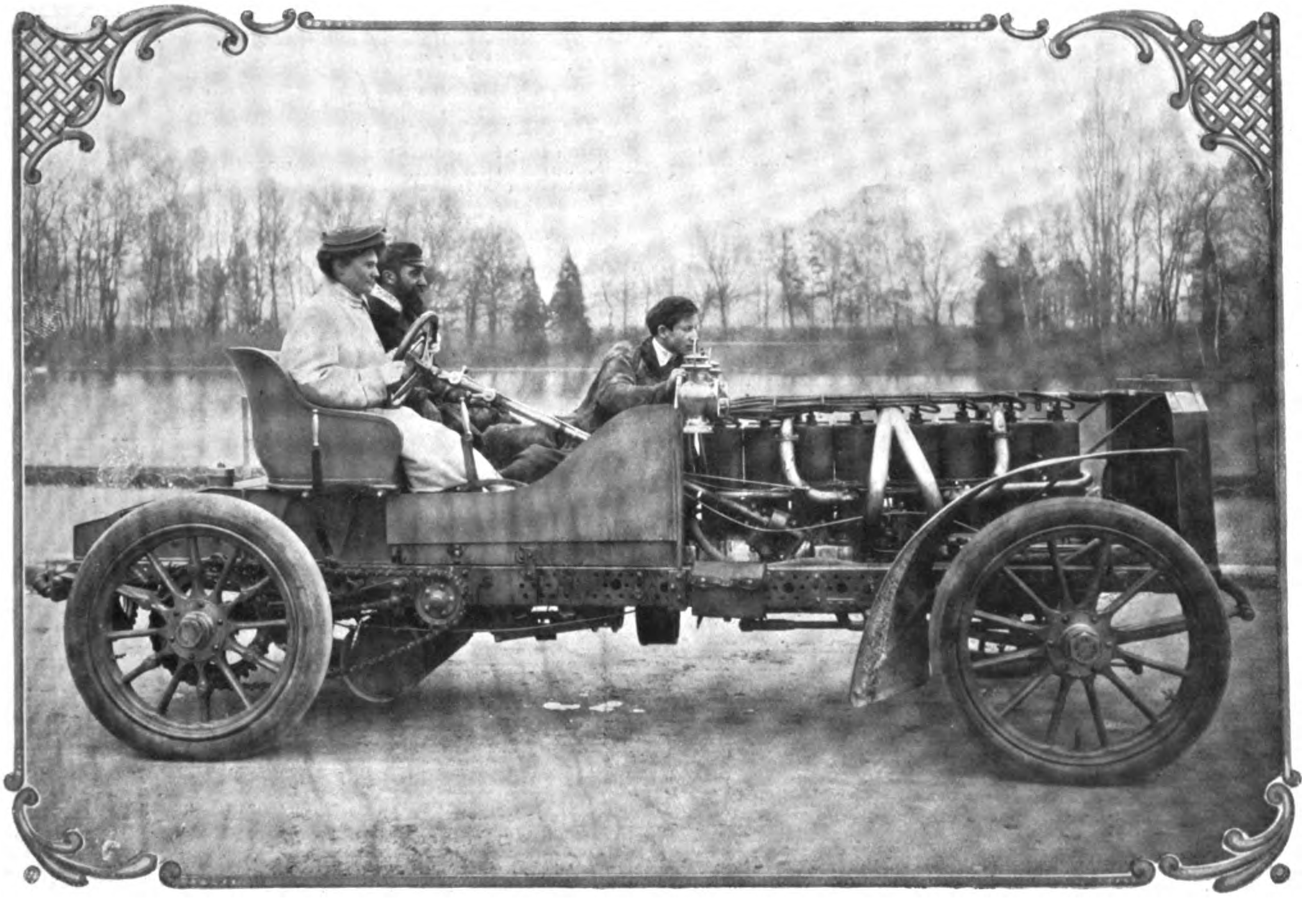

THE 200-H.P. BELLAMY RACER.—Probably the most powerful car which has yet been built is the 200-h.p. Bellamy Racer, shown in the above illustration. It has been built for an American lady—Miss Hockenzuhl—and has recently undergone its first trials in France, prior to making the attempt to lower the kilometre record—with which object it was primarily designed. The engine has eight cylinders, the bore and stroke of which is 183 mm. A separate throttle-valve is provided in each of the induction-pipes close up to the inlet-valves, and these can either be operated simultaneously or individually. Both a low-tension magneto ignition system and a high-tension system, with coils and batteries, are provided, and the carburettor is "automatic." An interesting feature of the car is that no change-speed-gear is fitted, but that the speed of the vehicle is regulated by controlling that of the engine. The wheel base is 2·8 metres, and the car is expected to attain a speed of 185 kiloms. per hour (115 m.p.h.).

THE AUTOMOTOR JOURNAL.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
Apl. 18-24 ...	*Side-Slip Trials.
May ...	British Gordon-Bennett Race Eliminating Trials.
May 19-20 ...	Glasgow-London Non-Stop Run.
June 1-7 ...	Motor Bicycle Endurance Trial.
June 11 ...	Automobile Races, Ranelagh Club.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
Oct.-Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Mar.	Paris-Rome (*La France Automobile*).
Mar. 19-27 ...	Frankfort Exhibition.
Mar. 20-29 ...	Nice Week.
Apl. 4-9 ...	A.C. America Commercial Vehicle Trials.
Apl. 5-15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16-May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18-23 ...	Paris-Nice-Rome.
Apl. 30-May 12	Antwerp Salon.
May. 1 ...	Carburettor Trials (A. C. de France).
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8-12 ...	A.C. Bordelais Automobile Week.
May 11-15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12-15 ...	Tours Tourist Trial.
May 14-15 ...	Nantes-Croisic (Motor Boats), *Monde Sportif*.
May 16-23 ...	Circuit National Belge.
May 23-31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16-17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 15-23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23-25 ...	Lucerne Motor Boat Races.
July 23-Aug. 5	Spa Automobile Fêtes.
Aug. 5-11 ...	Paris-Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 22-Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 5 ...	Dourdan Kilometre Trials (*Monde Sportif*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14-22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Law of the Highway.

EVERYBODY really ought to know what he can and cannot do on the King's highway, and what he legally has the power to object to other people doing. This is particularly the case with automobilists, most of whom use the highways of the United Kingdom more than any other of His Majesty's subjects. The admirable *résumé* of highway law (including the common law of the subject) comprised in the Paper which we publish in another column on "The Use of the Highway," read at the Automobile Club on the 17th instant by Mr. Moresby White, will, therefore, prove of value to almost everybody, whether they happen to be motorists or not. The Highways Act of 1835 is a prolix and confusing statute, and anybody who wants to find out from its pages what it really does and does not prohibit has to sit well up to his work. Mr. White's paper, therefore, is particularly commendable, as it succinctly summarises the leading prohibitions of the Act. The rights of road users in respect to one another, as determined by the common law of the realm, are also well and clearly stated. We cannot avoid agreeing with Mr. White in being at a loss to understand why, with the Highways Act of 1835 before them, the authorities should have considered that they were unable to cope with abuses of the highway by unprincipled motorists without exceptional legislation. Probably the stern provisions of the 1903 Act were simply a capitulation to popular clamour.

Mr. White shows that consequences, some incongruous and some amusing, would follow from any very literal enforcement of the provisions of the Highways Act. Thus a motorist who abandons his vehicle and goes on the other side of the hedge (even for a minute or two) is committing an offence; while any person riding on a carriage must, unless it is provided with reins, have some other person on foot or horseback to guide the same. There is something for the anti-automobilist, and an effective means for prohibiting excessive speed! If motor vehicles were to be steered by a man accompanying them on horseback, the results can be imagined. But, still, a motor car is a carriage for the purposes of any previous Act of Parliament.

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Icarus in Fetters.

SIR HIRAM MAXIM, who years ago spent so much time and money in experiments with a flying machine on a large scale, and provided very valuable data as to the lifting power of aeroplanes (though the machine itself was never permitted actually to fly), has evidently become as much impressed as anybody with the recent progress that has been made in free flight. So once more he desires to enter the lists and discover what his genius and resources can contribute towards the solution of the problem which has now been brought so much nearer than it was in the days of his experiments in Wembley Park. But nothing is more expensive than such experiments, and Sir Hiram Maxim points out that while in France, Germany, and the United States, research of the kind is supported by Government contributions, in this country the experimenter has to rely on his own resources alone. So Sir Hiram has struck upon the idea of utilising the popular interest in aerostation to provide the sinews of war for his campaign, and is going to put up a couple of glorified giant-stride merry-go-rounds, one at the Crystal Palace and one at Earl's Court, in which the rotating horses and cars are to be replaced by what are almost free flying machines, in the form of huge fish, and in which the employment of aeroplanes will enable free flight to be imitated to a certain extent. A proportion of the profits resulting from these undertakings Sir Hiram Maxim intends to devote to further airship experiments. He has become convinced that the problem is now one almost entirely of lightness and power of motor, that the art of manipulation is more learnable than previously supposed, and that the solution is within sight. Nothing so conduces to success as the firm conviction that success is within reach, and we trust that Sir Hiram Maxim's merry-go-rounds may at an early date provide sufficient funds to enable us to witness the resumption of experiments on the subject in this country on an elaborate scale.

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An Expert on the Insoluble Problem.

THE Royal Commission on London Locomotion will probably have nightmare when they have read the statistics on London traffic, on which a Paper was read before the Royal Statistical Society last week by Mr. E. J. Harper, an officer of the London County Council. The appalling congestion of London streets emerges with deadly impressiveness from Mr. Harper's unemotional collection of figures. The average passage of vehicles through the main streets—and, above all, over most of the principal bridges—has increased from last year between 7 per cent. and 10 per cent., and it is far from attractive to car owners to find that while private carriages, not excepting motor cars, have diminished in numbers, particularly along the Strand, the numbers of the heavy carts and vans have increased. This is what one would expect—the more heavy carts and vans are allowed to monopolise our principal streets, the more private vehicles of all descriptions will be driven out of them. Probably anybody who wants to attempt to do business in the Strand or Fleet Street usually goes along the Embankment and makes a dive up one of the cross streets, though here, again, the radiant wisdom which conducts all our municipal and public affairs—which, for instance, puts the Patent Office in Chancery Lane and the Stamp Office at the Law Courts—has arranged to diminish the amount of relief attainable in this way, by permitting the connection between the Strand and the Embankment to be cut off over a large area by the Adelphi Arches and other obstructions. If anything was needed to dot the i's and cross the t's in the evidence given by the Hon. John Scott Montagu before the Commission, on which we commented last week, it would be these stupendous figures. It will only be an alleviation, no doubt, but Mr. Harper's statistics clearly prove that if the vans and carts were excluded from the principal thoroughfares from 10 a.m. to 8 p.m., as Mr. Montagu proposes, it would go a long way to relieve the preposterous congestion. And, after all, it would be in the interest of shopkeepers and business people. It is a truly foolish idea to block up your street with vans unlading wares into your establishment when by this means you effectively prevent the access of the very customers to whom you desire to sell the articles they have unladed.

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A French Proposal for Solving the Driver Difficulty.

THE management of the Association Generale Automobile have been seriously tackling the difficult and thorny question of providing a supply of competent drivers, or perhaps it would be more correct to say, are taking steps to ensure employers being able to ascertain whether drivers who offer themselves for a post are competent men or not. A special committee has been formed under the presidency of Prince d'Arenberg, who has obtained the co-operation of a number of highly-experienced fellow-automobilists to arrange a programme of examination, on passing which the drivers will be entitled to the efficiency-certificate of the Association. A general determination on the part of car owners to employ no drivers not possessing this evidence of competence would practically ensure all intending drivers taking good care to pass the examination. The programme cannot fail, if satisfactorily and conscientiously carried out, to be highly beneficial to the industry. It is almost superfluous to add that similar action on the part of our own Automobile Club is urgently called for. The demand for competent chauffeurs is both enormous and increasing, and only too many car owners have found to their cost that they have discharged one incompetent man merely to exchange him for another who is more incompetent still. The troubles involved, however, are very considerable. The Automobile Club has already attempted to tackle the subject, but had to postpone dealing with it owing to the extreme difficulty with which it was beset. Perhaps in a short time, if the French scheme proves successful, the English club will be able to copy their methods and establish a similar system, to the great convenience of car owners and the benefit of the English industry.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.

DESCRIPTION OF THE COURSE.

OWING to somewhat conflicting accounts of the nature and principal features of the proposed Isle of Man course having found their way into the Press, and in view of the extreme probability of the Royal Sanction being accorded to the measure, the text of which we publish elsewhere, we recently arranged for a representative, who is well acquainted with the local conditions, to drive his car over the course. He has examined very carefully the whole of the road, and we feel sure his detailed description of it will prove of interest to our readers. He writes :—

"The course is a somewhat difficult and risky one, with many sharp, nasty curves, and the country is very varied and hilly at different points in the circuit. The course is shaped something like a flat fish with its nose at Ramsey in the north and the tip of its tail at the turning point at Malen cross roads in the south. The circuit is rather over 50 miles in extent. The Quarter Bridge, where the start will be made, is about a mile from Douglas, the principal town in the island, on the east side of the course. Four roads meet at the bridge, and close by is a comfortable hotel. The ground is level at the start, but rises almost immediately for about 400 yards with a gradient of from 1 in 100 to 1 in 15 at the top. Next comes a straight piece of road, and then about three-quarters of a mile of slightly falling road to the cross roads at the bottom of Bray Hill, which is about 600 yards long with a fairly stiff grade. From the hill top is a nearly straight level run to Governor's Bridge—a pretty rural spot. The scenery here is most interesting to the tourist, fine trees skirting the road on each side, but for the motorist there is an awkward, almost circular, curve, which should be taken with care. After taking the curve comes three-quarters of a mile of straight, slightly falling ground from Government House, the residence of Lord Raglan, to the junction of the roads at Onchan, a very quaint little village. From the end of the village the road gradually rises for a quarter of a mile, and a drop of about the same distance brings one to the foot of White Bridge Hill—a stiff piece of road to climb. For about the first 800 yards the ascent is very steep, about one in ten, and then gradually runs easier to the top. From this point there is a straight run of about a mile to the "Half-way House" to Laxey, where it is advisable to slow down in order to take the curve near the inn and also across the electric railway lines which are a quarter of a mile further on. After crossing the railway there is a mile or so of a straight, slightly falling road to the top of Baldrine Hill. The scenery about here is delightful to the tourist, but to the motorist the case is different, and care must be taken. The road, in and out, is in the form of the letter V, dropping down from Douglas steeply, and rising similarly on the other side, not forgetting a rather sharp corner at the point of the V. A little further on, near the county school on the Laxey side of the V, there is a sharp curve followed by a slightly rising grade of straight road to the junction of the Tonan Road (there are a great many cross roads on this part of the route). From this point there is a falling grade for one and a half miles to the south corner of Laxey village. As seen from this point, Laxey is a charming spot. The lofty headland hides the valley until one gets round the corner, and then the whole village comes into view suddenly. It is a pretty scene. White houses dot the landscape on each side of the valley, and the river flows down the centre, while ahead is the great Snaefell Mountain, up which tourists are able to travel by electric car. Laxey is an ideal place to stay at in winter or summer. It has a station on the electric railway, and there are several comfortable hotels and boarding houses, while the lead mines, together with the mountain and glen, afford plenty of interesting spots for exploration.

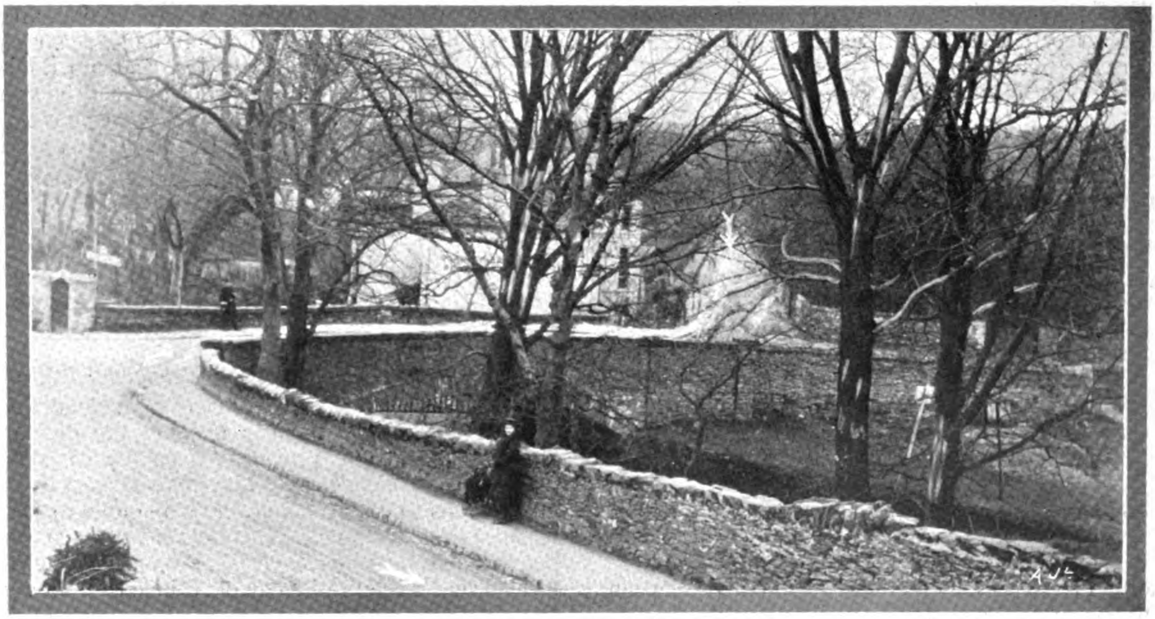


Photo by D. Collister.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.—On the proposed course. The Quarter Bridge, near Douglas, the point near which it has been suggested the start should take place.

"The roads in and out of Laxey together form the letter U, each road being about three-quarters of a mile long, with a rather sharp bend joining the Ramsey limb of the letter, and crossing the lines of the electric railway twice at the bottom of the U. The grade, however, is easy both in and out of the village, and, when the curve is rounded, there comes a straight run of a mile and a half right on to the rock cutting, where the road is cut into the side of the high solid rocks. A rather sharp curve has to be made here, and then comes a falling grade to the Dhoon Glen Hotel, where some picturesque scenery is found. From the hotel one travels along an almost level road for about a couple of miles—with only one rather sharp turn at the river—to the top of Corney Hill—a very steep, short hill, with a curve at the foot, which calls for care. An easy rise from here for three-quarters of a mile carries the motorist past Cardle Voar, and then he meets with a stiff rise of about 300 yards, but is immediately rewarded with a straight mile spin, almost level. Easy, varied road for half a mile reaches the great Slieau Hague Hill, which is stiff and hard for three-quarters of a mile, when it joins Manghold Road with a sharp curve. This hill should be taken with brakes well in hand, but the road surface is good, and the sweep round the hill fairly gradual, except at the curve mentioned. From the Manghold Road junction a level mile leads to the junction of Port E. Vullin Road, and then comes half a mile easy

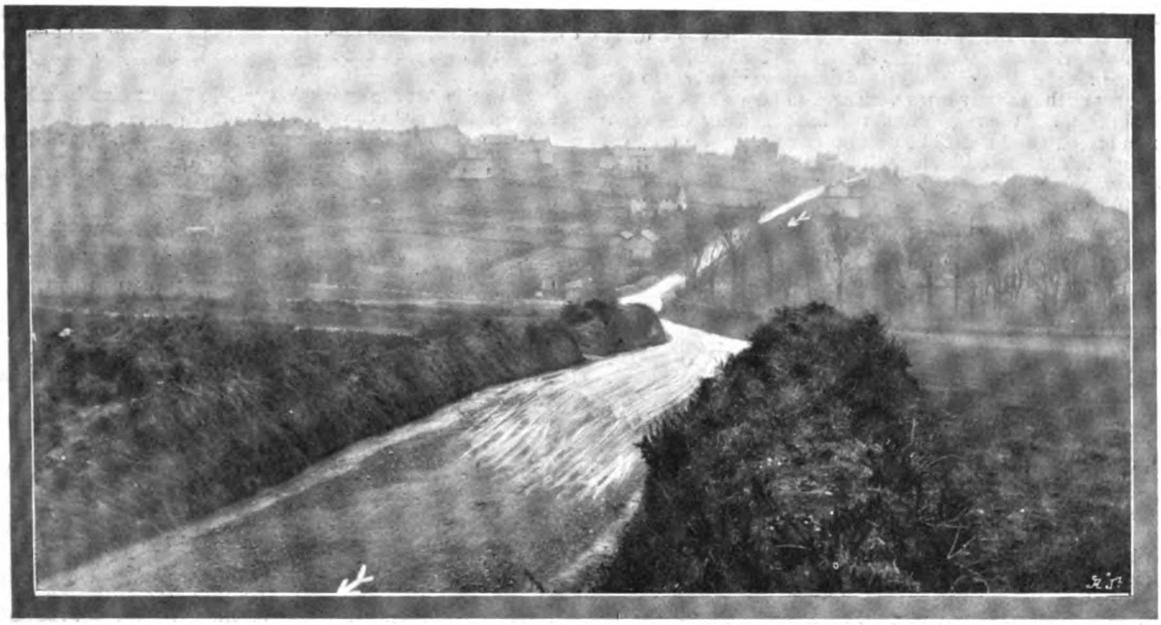


Photo by D. Collister.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Bray Hill, one mile from the start.

fall to Ballure Bridge curve and the electric railway crossing, which should be taken with care. Another quarter of a mile on a slight descent leads up to the entrance to Ramsey, *viâ* Waterloo Road—an almost straight road through a pretty part of the town to the Court House, where there is a nasty curve.

"Leaving the northern Metropolis, as Ramsey is called, the motorist has done with hills, and faces a nine-mile almost level run to Ballaugh village. There is, however, one sharp turn at Sulby Bridge which should be carefully taken. Bowling along merrily the traveller soon comes to Bishopscourt—the residence of the Lord Bishop of the Island—an ideal rural spot—and then on to the village of Kirk Michael, where are some interesting Runic crosses and the grave of the good Bishop Wilson, who lived in the seventeenth century. All along the road from Ramsey to the ancient village of Kirk Michael are dotted small villages, thorough specimens of rural hamlets, such as Sulby, Ballaugh and Sulby Bridge, with good hotels and boarding houses and a useful railway service. A slight rise from the Kirk leads on to the Glen Helen road, and from here to Ballacraine is a varied, up and down road of six and a half miles. About half-way, and after a straight run of a couple of miles, Craig Willie's Hill has to be negotiated. The hill is very steep, about three-quarters of a mile long, and has a sharp curve near the bottom and another at the Glen Helen Hotel—a beautiful spot near Mona. The driver should take the hill with caution.

"Leaving Glen Helen one has two and a half miles of a good run to Ballacraine cross roads. Here the road is narrow, but has a decent surface. Another two and a half miles of nearly straight road leads to the railway bridge curve—a very sharp one, which should be taken slowly. Close at hand now is Foxdale Hill, very steep near the top, but when this is climbed there comes a splendid spin of about five miles, over a good road, to Silverburn Hill and Bridge, which drivers will find it necessary to take easily. Another half mile lands us at Malew cross roads, where a sharp turn is made on to a slightly rising road of half a mile to the limekilns. From

Photo by D. Collister.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.—An awkward twist at Ballalonney Bridge.

this point the motorist should drive dead slow until the sharp, dangerous turns at the Rushen Abbey Bridge and Gardens, and Ballasalla right-angle are passed. Douglas Road is now reached, and for a couple of miles the driver can spin along to the double corner at the railway bridge. The road here drops sharply on to the bridge, and then again from the bridge, so that the curve is an extra bad one and should be taken very slowly. At the foot of the slope is another curve, and then comes a level mile to the river bridge, where a nasty turn has to be made, and then half a mile of straight, gradual rise, reaches Lanton. From here the run is straight to the Brown Cow Bridge—a short, stiff rise—and then on to Richmond Hill—probably the most risky hill on the route, and to be taken with care, owing to the steep decline and the junction at the bottom. But this accomplished in safety, and the motorist gets a fine run on a gradual down grade to the Quarter Bridge, where the first circuit is completed."

GORDON-BENNETT ITEMS.

THE following is the text of the Isle of Man "Enabling" Bill, as passed by both branches of Legislature, and signed in Tynwald :—

We, your Majesty's most dutiful and loyal subjects, the Lieutenant-Governor, Council, Deemsters, and Keys of the said Isle, do humbly beseech your Majesty that it may be enacted, and be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lieutenant-Governor, Council, Deemsters, and Keys in Tynwald assembled, and by the authority of the same, as follows (that is to say):

Authorisation of Races with Light Locomotives.

1. (1) The Board may, on the application of any persons or club, by order declare that any public roads within this Island may be used for races with light locomotives during the whole or part of days specified in the order, not exceeding three days in the year (Sundays excepted).

(2) The order shall contain such provisions as the Board may deem necessary for the temporary suspension and regulation of railway, tramway, or other traffic, for the safety of the public, for the restriction of speed in populous places, and for other purposes incident to the proper conduct of such races.

(3) Such public notice shall be given of the provisions of the order as the Board may require.

(4) No provisions of any Act, bye-law, or regulation restricting the speed of locomotives, or imposing any penalty for furious driving, shall apply to any light locomotive, or the driver thereof, engaged in such race, save so far as the same may be incorporated with the order.

Expenses of the Board.

2. The expenses of the Board in carrying any order under this Act into effect shall be defrayed by the applicants, and the Board may, before granting the order, require the applicants to make such deposit as may, in their opinion, be necessary to defray such expenses.

3. In this Act the expression "light locomotive" shall have the same meaning as in the Highway Act, 1899.

"The Board" shall mean the Highway Board acting with the Lieut.-Governor.

4. This Act shall remain in force until December 31st, 1904.

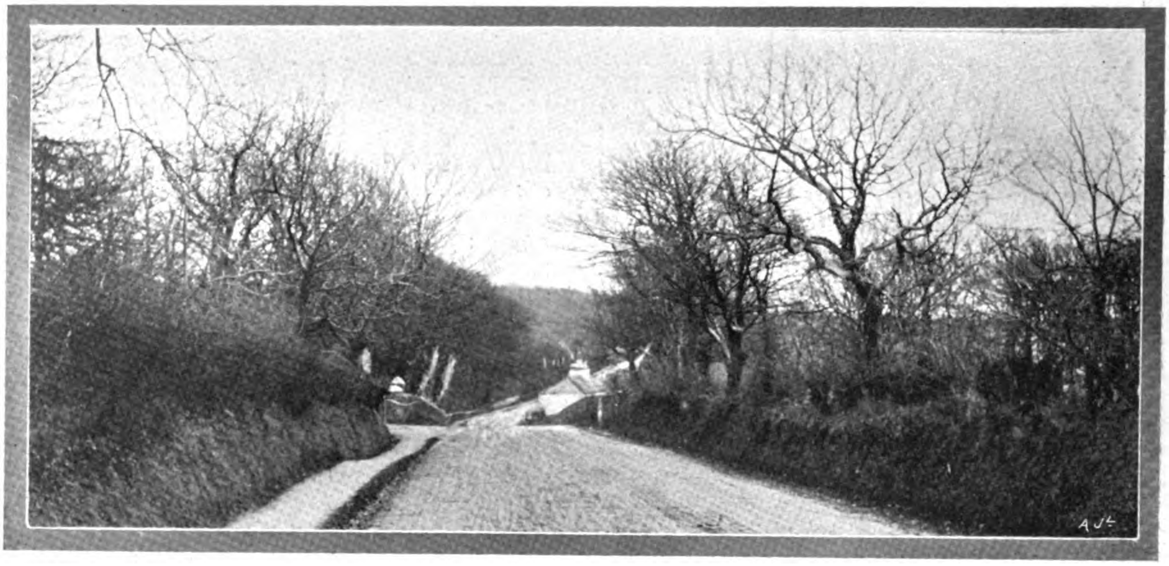


Photo by D. Collister.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Mount Murray Hill and Bridge.

The course, which we have described fully in this issue, will probably be traversed six times for the purposes of the Eliminating Trials. The fourteen cars which have been entered will probably be started at intervals of four minutes, and two controls will be established at Ramsey and Ballasalla, with possibly a third at Laxey. The course described may be varied by taking the Snaefell mountain road, thus avoiding Laxey Control. It may also be prolonged about ten miles in a northerly direction. During the week a couple of racing cars—a light Darracq, driven by Mr. A. Rawlinson, and Mr. Austen's Wolseley, driven by Girling—have been taken across to the island in order to test high-speed cars at their top pace. The date of the trial will probably be May 10th.

Arrangements for the French Eliminating Trials are being perfected as quickly as possible. Every precaution will be observed to ensure no accidents occurring to the public. The roads through villages and sharp turns will be oiled, and both sides of the streets through the villages will be railed off, with protected passages at every fifty metres, permitting the crossing of traffic. Two trumpeters will be stationed at the entrance of each village, and announce the approach of every car. M. Tampier, the Timekeeper of the A.C.F., has estimated that there will be 15 kilometres of road treated with oil, and 35,000 metres of fencing erected along the course. The general public will be restricted to the fields adjoining the course, and every 100 metres an official will be placed on either side of the road for the entire distance of the course. The number of officials required in all will be about 3,000.

There will probably be two neutralised portions, viz., at Bethel and Vouziers, and in addition five stops of one minute each, viz., at the sharp turn at Chemery, the cross roads at Flize, and the level crossings at Ballay, Novy, and Pont du Chesne. Altogether there will be 29 stoppages, coinciding with the number on the Taunus course, which will give an idea of the quick starting capabilities of each machine. The neutralised portions and the stops altogether will total to about 1 hr. 45 mins. for the entire course.

The third big Gobron-Brillié racer will be driven in the French Eliminating Trials by Alexander Burton, whose photograph appears this week in our pages in the group which we publish of a number of prominent automobilists in connection with the Cannes Automobile Week.

The German Eliminating Trials will be probably run on a Sunday in May, starting from Lübschenbrünnen at about 5 a.m., and making a circuit of about thirty-one miles. This distance will be covered six times for the test.

The car designed by Mr. Cecil Hamelin Taylor is being built by the Alden Sampson Manufacturing Company, of Pitfield, Mass., for the American team, and is of the side chain type. The engine, which is nominally of 40-h.p., is expected to give about 70 or 80-h.p. on the brake, and weighs 510 lbs. It has steel cylinders, and is fixed direct to a specially trussed pressed steel frame, which is carried on very long semi-elliptic springs. We hear that the valve-gear is somewhat unusual, and that the sides of the bonnet, which is boat-shaped, is formed by the radiators somewhat as on the Renault cars. In order to render them accessible, the carburettor, governor, dynamo, commutator, and the circulating pump are all fixed on the dash. The main clutch is said to be of novel construction, but, so far, no particulars are available. The change-speed-gear gives four forward speeds, is of the sliding spur-wheel type, and has self-aligning ball-bearings throughout. The brakes are of the expanding type; there are two on the countershaft in addition to those acting direct on the hubs—all interchangeable. Nickel steel is largely used in the construction of this vehicle, the wheel base of which is about 10 feet and the weight about 1,850 lbs. in racing trim.

The Hewitt racer has a smaller engine than that on the Sampson car, and is of the live-axle type, with direct drive to the propeller-shaft on top speed.

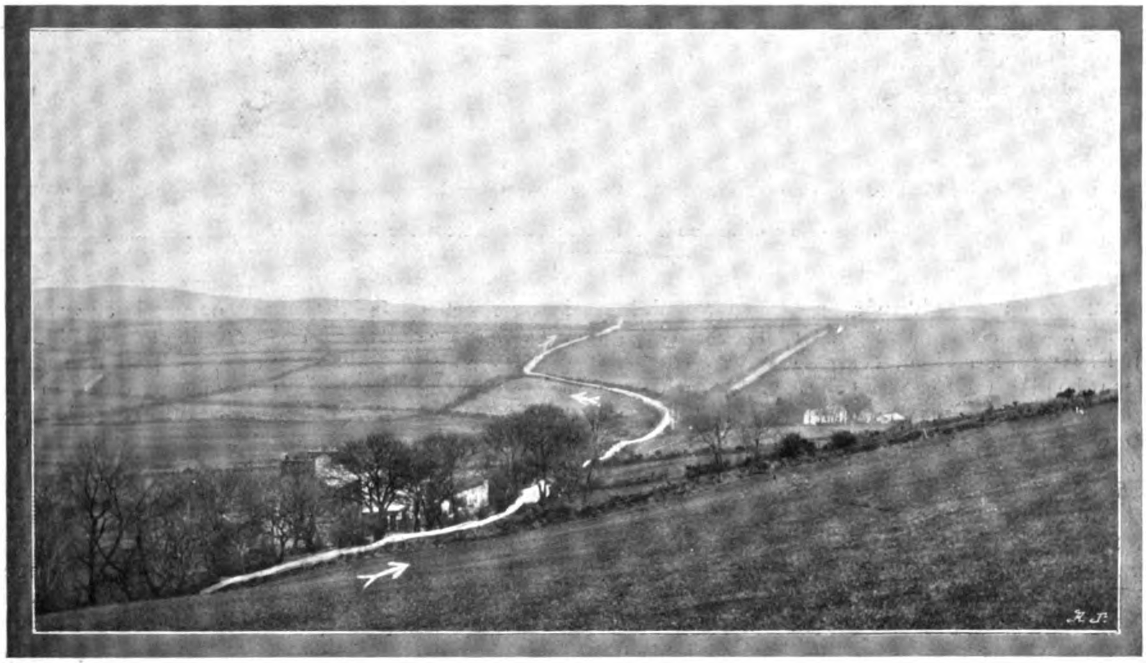


Photo by D. Collister.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.—A steep dip at Richmond Hill with Cooill in the distance. A splendid point from which to see the Race.

The first enquiry by the Local Government Board, under the new Motor Car Act, in regard to the restricting of speed below 20 miles per hour, at the request of local authorities, was appointed to take place on the 24th instant, at the Guildhall, Winchester. The application is that of the borough of Winchester, for the limiting of the speed in all the roads of the borough to a maximum of 10 miles. Earl Russell and the Hon. J. Scott Montagu, M.P., will be present, and give evidence at the enquiry in the interests of the A.C.G.B.I., which body will be represented by Mr. Ricketts, instructed by Mr. Warner. Not only will there be strong evidence given on behalf of automobilists, but also by a number of local hotel proprietors and leading ratepayers, who are strongly opposed to the proposed speed limit being put into force.

The Duke de Ratibor, president of the German Automobile Club, representing Prince Henry of Prussia, who was unavoidably prevented from attending, formally inaugurated the Frankfort Automobile Exhibition last Saturday.

THE 20-H.P. HUTTON PETROL CAR.

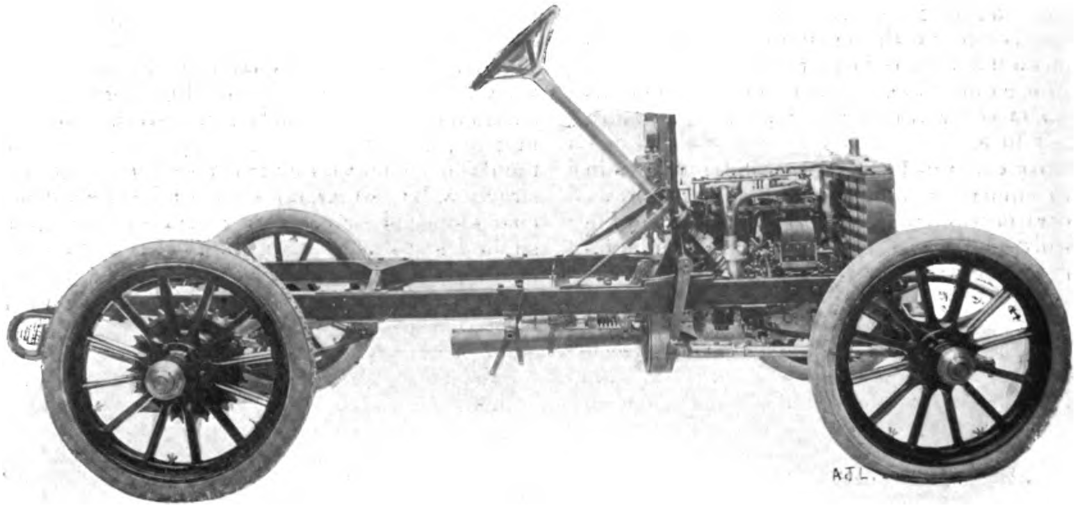


FIG. 1.—View of the 20-h.p. Hutton Chassis from the Right Side.

SELDOM has more curiosity been aroused in automobile circles than it has recently concerning the vehicles which Messrs. J. E. Hutton, Limited, are now putting on the market, for it has been known that these cars, which are being constructed at the Company's works at Thames Ditton, to the designs of Mr. T. W. Barber, are not only intended to compete with the productions of the very best firms—either English or Continental—but that many radical departures from ordinary practice have been made in them. These new makers set out with the determination that their cars should be built of English materials throughout, and that in the matter of design and workmanship they should be second to none. Already a considerable amount of time has been spent in overcoming the difficulties originally experienced in obtaining materials of the very highest grade in this country to suit their requirements, and this difficulty alone has caused a certain amount of delay in the appearance of their cars upon the market. During the past year or so, the various novel portions of the mechanism have been undergoing lengthy tests in actual practical use on trial cars, so that although the 20-h.p. chassis now on view at the Agricultural Hall Show is the first actual Hutton chassis that has been built, yet the Company have every reason to be confident that their cars will speedily earn an enviable reputation for themselves.

There are so many interesting and novel features on this car—many of which are being incorporated into the

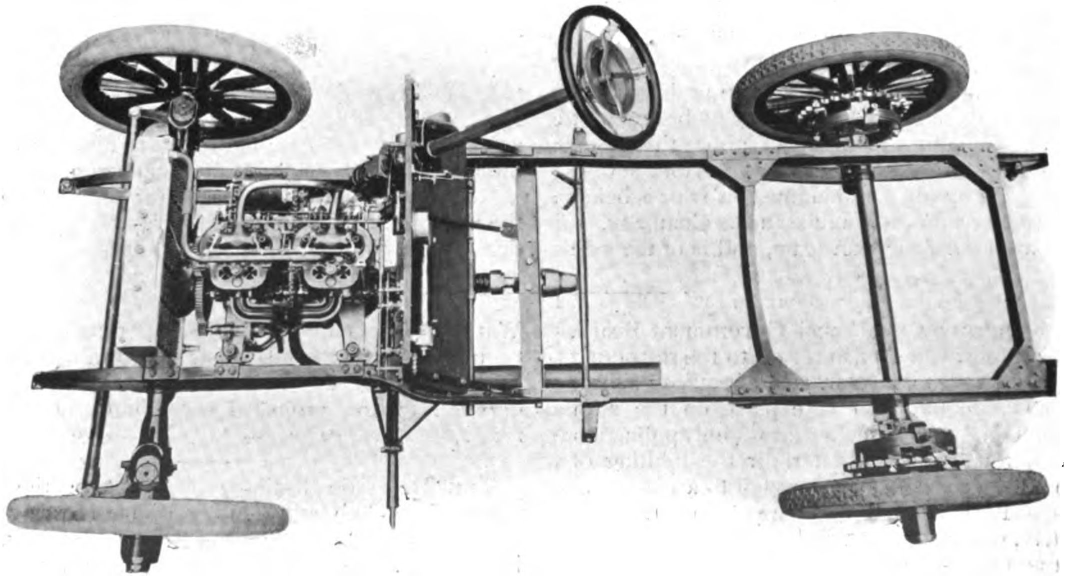


FIG. 2.—View of the 20-h.p. Hutton Chassis from Above.

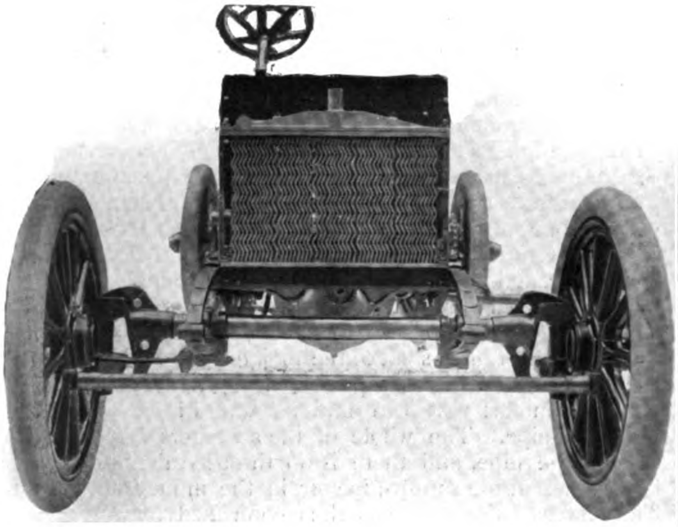


FIG. 3.—Front View of the 20-h.p. Hutton Chassis.

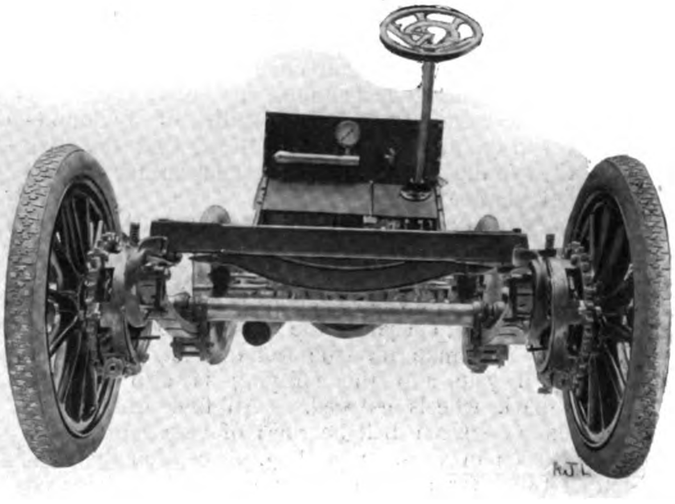


FIG. 4.—Rear View of the 20-h.p. Hutton Chassis.

racing cars that they also have in hand—that a first inspection is almost apt to be bewildering to those wishing to obtain a good general knowledge in a comparatively short space of time. We therefore propose this week to give but a brief description of it, and to afterwards enter into fuller detail with the assistance of further illustrations. Even at the present moment the chassis is not quite complete, so that the accompanying photographs which we have taken of it do not show everything in place. The only really important missing portion, however, is the change-speed-gear, and this is shown separately in another illustration (Fig. 8). The chassis is shown from four different points of view in Figs. 1 to 4, the front portion) enabling the steering gear and the method of suspension to be seen) in Fig. 5, and the central part, showing the main clutch, in Figs. 6 and 7.

Concerning materials, a special alloy of nickel steel is very largely used for many of the most important parts of the car, where rolled metal, solid drawn tubing or forgings are employed. Those portions for which castings are more suitable are made of cast steel, and this, too, is of a special grade, being very tough, hard, and free from flaws. Most of the parts are larger externally than usually, and are therefore stronger, but the weight is kept down by making them hollow; thus, for instance, it will be found that very few solid rods or shafts are used, but that tubes have been adopted instead. So hard are many of the parts that special tools have in many cases had to be constructed, for the Company, to enable them to machine them properly in their works. Quite a large machine tool equipment is already installed there, and the full equipment is still proceeding at the present time. The works are unusually well adapted for their purpose, being of considerable size, arranged all on the ground floor, and having considerable frontage to the river. All parts are made strictly interchangeable, jigs being employed to ensure accuracy in this respect. The entire work of manufacturing is carried out on the "limit gauge" principle, and a very effective tool-shop department has been organised.

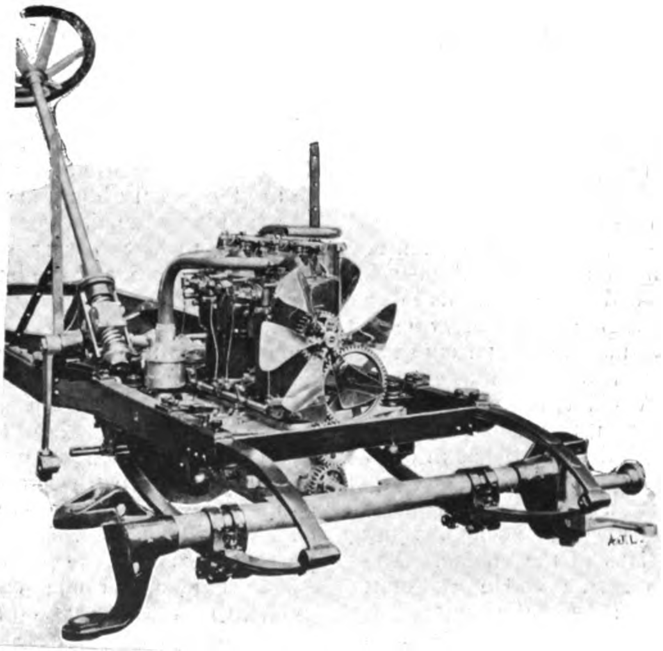


FIG. 5.—Front portion of the Hutton Chassis, showing Steering Gear, Steering Heads, and Front Axle Suspension.

The pressed-steel frame, the shape of which is well seen in Fig. 2, is carried upon the two axles by semi-elliptic springs, which pass beneath those axles, instead of above them. The axles are quite straight, and are in themselves thick nickel-steel tubes. The bracket-hangers, by which the springs are attached to them, are so arranged that the weight of the vehicle is not taken by the bolts that pass through these brackets, but upon a keeper which slides into grooves in each side of the brackets—beneath the springs — and is merely prevented from moving by the horizontal bolts, as seen in Fig. 5. Each spring is held down upon its keeper by a pair of lock-nutted set-screws fitted above the springs The inner ends of all four springs are carried by small sliding blocks, which can move forwards or backwards in their guides. The rear ends of the back springs are connected with the curved spring-horns by shackles, and the front ends of the forward springs are attached to the main-frame by projecting curved leaf-springs, as seen; the front springs, therefore, form three-fourths of a double-elliptic spring, but it will be noticed that the axle is attached to the under-springs at a point further forward than their centres.

The steering heads are formed by very large cast-steel brackets, securely fixed to the ends of the front axle. These are well seen in Figs. 3 and 5, and it should be pointed out that they have a considerable forward rake besides slightly splaying the wheels outwards at the top; the rake has the same effect as on an ordinary bicycle, and the splaying is also adopted for the back wheels as well. All four wheels are mounted on special ball bearings of very large size, and, as seen in Figs. 1 and 3, exceptionally substantial tubes form the steering connections between the steering heads, and between them and the steering gear.

The steering gear, too, is unusual in many respects. It is of exceedingly substantial construction, as may be noticed in Fig. 5. The inclined tube to which the wheel is fixed is provided with a three-thread worm, and there is a ball-thrust bearing above and below it. The square nut riding on the thread is recessed at each side to receive circular discs, having deep slots formed across their outer faces. The discs are free to turn in the recesses, and the slots engage with radial arms which project from the same shaft that the downwardly-projecting steering-arm is fixed to at its outer end.

The engine itself was described and illustrated by us on February 27th, when we commented upon its exceedingly neat design, and gave full particulars concerning it. Instead of being rigidly fixed to the frame, helical springs are introduced both above and beneath its projecting feet, through which pass the four holding-down bolts. The ends of the bolts are secured to brackets that are firmly fixed to the side members of the frame, and the springs are thus able to absorb all such shocks as those which may be imposed when the clutch is allowed to engage too suddenly; the springs also permit of a certain amount of twisting of the frame and allow this to occur without straining the transmission mechanism.

The engine is started from a shaft which projects out from the frame on the near side, as seen in Figs. 2, 6, and 7, instead of being arranged in front. This shaft lies beneath the wing in a finished vehicle and its inner end carries a bevel wheel that meshes with a larger bevel just behind the fly-wheel. Normally, this starting shaft remains stationary as usual, and it frees itself as soon as the engine is set in motion. A sliding key of much the ordinary form is introduced and this is brought into engagement by a small sliding rod that projects through the frame, as seen in the illustrations.

It will be remembered that a low-tension ignition system is employed, but the magneto itself was not shown in our previous illustrations of the engine. The magneto, however, is visible in Figs. 1 and 2, where it will be noticed that it lies to the right of the engine, and is driven by a chain, passing across between the cylinder castings, from a sprocket wheel on the centre of the cam-shaft. The time of ignition is varied from the uppermost of the three small hand-levers above the steering-wheel, this lever moving over that portion of the quadrant which is nearest the driver.

The carburettor is also fixed on this side of the engine, a branched induction pipe being led direct from it to each pair of inlet-valves. It is specially interesting because it is made entirely of aluminium (except the jet), because it is of exceptionally simple and accessible construction, and because no attempt is made to obtain a constant richness of mixture. It is of the float-feed spray type, and has an annular float that surrounds the jet. The only control provided upon it consists of a sliding sleeve—under the control of the automatic centrifugal governor on the cam-shaft of the engine—which regulates the proportion of air that passes the spray jet, and the relative amount that can find its way direct to the induction-pipe. The whole of the air enters through a single large pipe, and there is no throttle-valve of any kind either in the supply-pipe or in the induction-pipe. The power of the engine is thus controlled by varying the richness of the explosive mixture, and its speed can be varied by the driver from an accelerator pedal that neutralises the action of the governor to the required extent. It is curious to notice that Mr. Barber is convinced of the superiority of this system, although the majority of other makers have devoted so much time and trouble recently to the construction of "automatic" carburettors for maintaining a constant degree of richness. We understand that he is so satisfied with the control obtained by his carburettor, that he intends to discontinue fitting the variable lift device to the mechanical inlet-valves on their standard engines in the future. On the present chassis the lift of these valves is regulated by a small hand-lever on the dashboard.

The exhaust-box is quite one of the most extraordinary features of the Hutton car, for although there is a large, straight, open passage right through it, we understand that it renders the exhaust remarkably silent. We have not, as yet, had the pleasure of seeing one of these silencers in use, so that we cannot speak as to its relative effectiveness from personal experience. The box is visible in Figs. 1, 2, and 7, though it is, perhaps, most clearly shown in Fig. 6. The open passage, right through it, is of about the same size as the exhaust pipe, and the principle upon which the silencer works is that of causing the exhaust gases to inject air through the box, so that it mixes thoroughly with them, cools them, and deadens all noise. The exhaust-pipe itself merely projects into the forward end of the exhaust-box, and there is a free annular space all round it for the air to enter. Further supplies of air are drawn in at two other points where the perforations are seen in Fig. 6, and the burnt gases, together with the air, issue out in a steady stream at the rear end of the box. Apparently, the box itself never gets hot, even though the exhaust-pipe may be red-hot throughout its length. It might almost be natural to suppose, too, that by this arrangement it would be impossible for any smoke or smell of any kind to issue finally from the box when the car is properly under way, because the combustion of any partly-consumed hydrocarbons might easily be completed when supplied with the requisite oxygen inside the box. Obviously, there can be no back pressure from an exhaust-box of this kind.

The radiator forming the front of the bonnet is exceedingly light, as it is made entirely of aluminium. The upper and lower water spaces are each formed by two castings, which are bolted together, and these containers are connected together by a large number of small tubes,

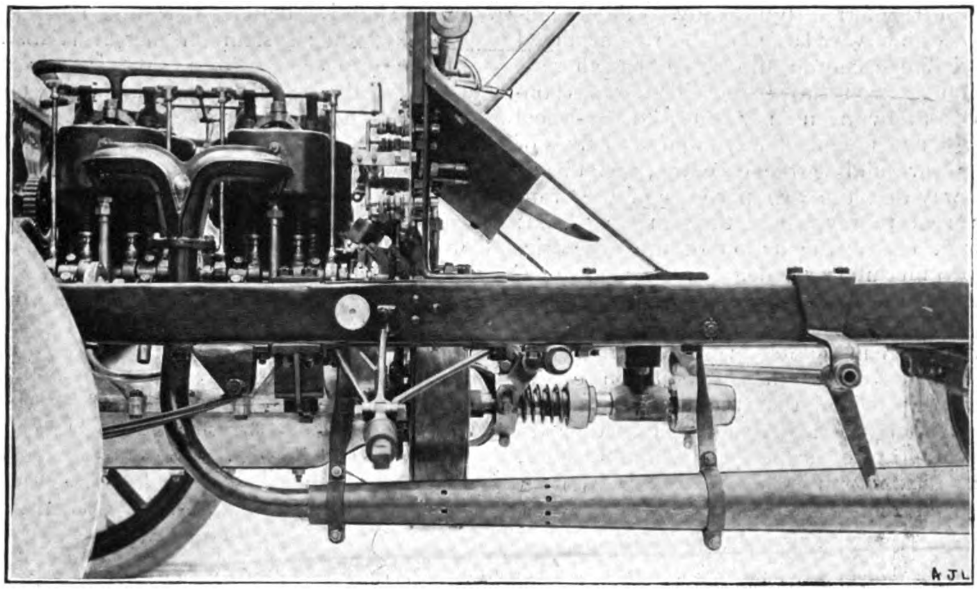


Fig. 6.—Central portion of the Hutton Chassis from the Left Side, showing the Engine, the Main Clutch, and the Exhaust Box.

which are bent into a zigzag shape, as seen in Fig. 3. The tubes are expanded into the plates at each end in such a way that they are not at all likely to leak. The special feature of this radiator, however, is the shape of the tubes, for we understand that its effectiveness is materially increased by thus bending the tubes, instead of making them straight. This is not so much a question of increasing the cooling surface as of breaking up the water inside, so that the whole of it comes in contact with the sides of the tubes. We are told that experiment has shown the cooling effect to be between two and three times as great with zigzag tubes as with straight tubes.

The main-clutch (visible in Figs. 6 and 7) is formed by two bronze half-rings which lie inside a cast-iron clutch-drum, and are forced apart by a pair of radially arranged screw-fed wedges by the clutch-spring. The clutch-drum is formed separately from the flywheel and is bolted to it; it also forms a reservoir for holding a considerable quantity of oil. The spring which normally holds the clutch in engagement surrounds the shaft, and is easily adjustable. The wedges are mounted upon small feed-screws carrying projecting arms, which are engaged by the sliding member of the clutch. The feed-screws fit into corresponding sockets, which are held in place in such a way as to give a simple adjustment for taking up wear, and the half-rings are so carried on the clutch-shaft that they can be moved inwards and outwards parallel with one another; the springiness of these clutch-rings is not relied upon in any way to make them fit the drum.

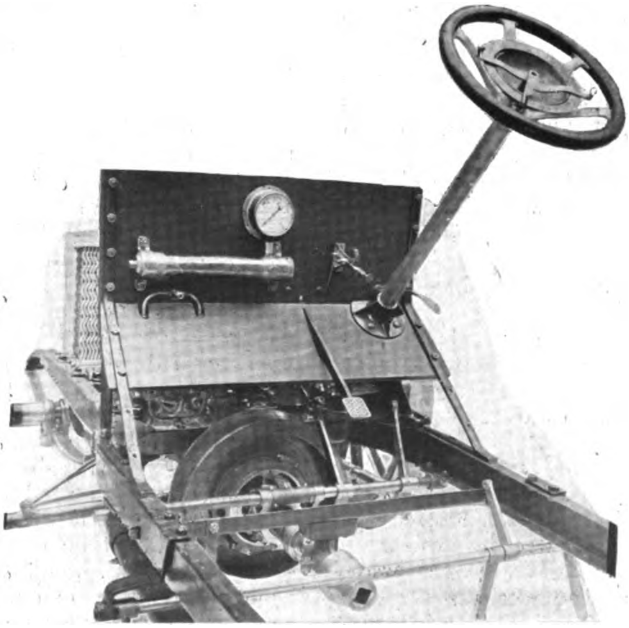


Fig. 7.—Central portion of the Hutton Chassis, showing the Hand Levers above the Steering Wheel, the Hydraulic Accumulator on the Dash, and the Expanding Main Clutch.

The Barber variable-speed-gear is, in Fig. 8, shown with the top cover of the gear-box removed, to show the manner in which the power is transmitted from it to the sprocket - wheels, from which the side chains pass to the rear wheels of the car. We do not propose at the moment to more than indicate the general principles upon which this gear is based, but it is in certain respects similar to the Newman gear, which was described by us in September last, though the underlying principle has been carried out in a very different manner.

The variable-speed-gear proper is enclosed inside the large centrally-placed drum which is seen inside the gear-box. The axis of the drum is in line with the clutch-shaft in the car, and a central shaft inside the drum is driven by the engine whenever the clutch is in engagement.

The shaft inside the gear carries an eccentric of special construction, which is so arranged that its degree of eccentricity can be varied to any desired extent, or that its strap can be brought concentric with the shaft. The eccentric is controlled hydraulically, by oil under pressure, from an external system which will be referred to presently. The eccentric strap revolves on a very large ball-bearing arranged between it and the eccentric block, so that there is very little friction between these parts. The strap is connected by arms and by ingeniously contrived free-wheel clutches with the two independently mounted halves of the large drum surrounding the eccentric, and this is done in such a way that the two portions of the drum are normally caused to revolve at the same speed, but in opposite directions, by the action of the eccentric, their speed depending upon its degree of eccentricity. It is not necessary, however, that the two portions of the drum should revolve at equal speeds, for the mechanism driving them is practically equivalent to a differential-gear, inasmuch as either of them can revolve at a slower speed, provided that the other runs at a proportionately higher speed. Assuming that they are permitted to revolve at the same speed as one another, the variable-gear inside them is capable of driving them at any speed from zero—when the eccentric strap is concentric—up to about one-sixth the speed of the engine—with maximum eccentricity. This reduction is so great that it is, of course, necessary to again "gear up" between the drums and the road wheels, and it is for this purpose that the spur-wheels, seen in Fig. 8, are provided; each of the drums has a gear-wheel formed outside it, one meshing with each of the smaller pinions on the short longitudinal lay-shafts. These lay-shafts drive the shafts carrying the sprockets (for the side chains) through bevel gearing, as seen, and it will be understood that at any time one of the drums drives one of the sprockets, and the other drum drives the other sprocket. The small pinions are not fixed to the longitudinal lay-shafts, but are free to slide upon feather keys on them, so that in this way an extremely simple form of reverse gear is obtained, it being only necessary to slide the one pinion forward, and the other backward, so that each of them is brought into mesh with the other large spur-wheel.

Not only does this variable-speed-gear act as the necessary differential-gear of the vehicle, but it also permits the car to "coast" whenever it tends to run faster than the engine is tending to drive it. For this reason the engine cannot be made to act even as a partial brake, as it does on most vehicles. The whole of the gear runs in oil, and, in spite of the fact that there is a considerable "gear down" and "gear up," as we have said, we are told that the average efficiency of the mechanism is as much as 87 per cent., and that it is even slightly better than this on the "top" gear. The hydraulic system on the car is not only provided for the purpose of operating the change-speed gear, but is also made use of for operating powerful brakes acting direct on the driving wheels. Oil is used as the fluid medium, and this is forced by a plunger pump into the accumulator (seen in Figs. 4 and 7) on the dashboard. The pump is driven by spur-gearing at a relatively slow speed off the magneto, and the accumulator is provided with a pressure gauge, as seen. The accumulator consists of a cylinder containing a spring-loaded piston, and there is a relief valve that comes into operation at a pressure of 350 lbs. per square inch, by-passing the delivery back to the suction. The oil from the accumulator is led to valves which are controlled by two of the small hand-levers above the steering pillar. The lever on the right (Fig. 7) controls the pair of valves which admit and exhaust, respectively, the oil to and from the hydraulic brakes, and the lever on the left has the same effect on the valves for the gear mechanism. When these levers are moved in the one direction, the oil passes to small hydraulic cylinders, the pistons of which apply the brakes, or increase the eccentricity of the eccentric in the gear-box. When moved back to their neutral positions, the pistons in the hydraulic cylinders remain in whatever position they then are, and when the levers are moved in the opposite direction the oil is allowed to flow back from the cylinders, so that the brakes can free themselves, or the eccentric can travel to a less eccentric position. An additional use is ingeniously made of the spring in the hydraulic accumulator, a second piston being provided behind its other end, and that end of the cylinder being used as a cushion for the hydraulic brake and gear cylinders.

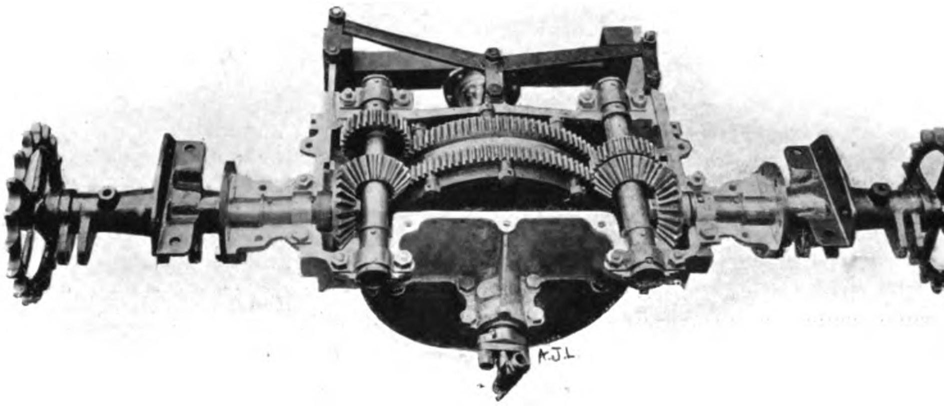


FIG. 8.—View of the Barber Variable Speed Gear, for the 20-h.p. Hutton Chassis.

Both internal and external brakes are fitted to the hubs of the rear wheels, the former being those which are operated hydraulically, and the latter being worked by hand. The internal brakes are of much the same construction as the main clutch, except that one screw-fed wedge is employed instead of two.

The car has a wheel-base of 8 ft., the track is 4 ft. 9 in., and the wheels are fitted with 870 by 90 mm. tyres. In certain cases special wheels, which have been devised by Mr. Barber, will be employed, these having tangent, instead of radial, wooden spokes. They are, in consequence, rendered extremely strong. The spokes work in compression instead of in tension, but, otherwise, in principle, the wheel is very similar to an ordinary cycle wire-spoke wheel.

(*To be continued.*)

THE 4-CYLINDER 15–20-H.P. BROOKE PETROL CAR.

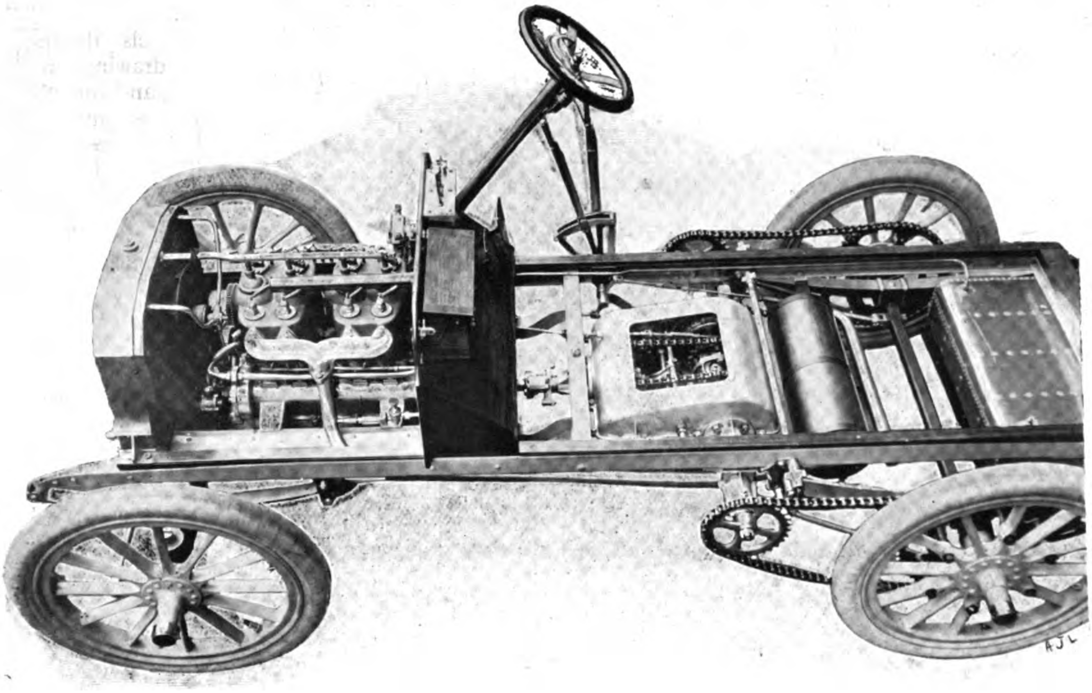


FIG. 1.—View of the 15–20-h.p. Brooke Chassis from above.

As already mentioned in our columns, one of the special novel features at the Exhibition now being held at the Agricultural Hall, is the first 4-cylinder vehicle which has been built by Messrs. Brooke and Co., of Lowestoft. Hitherto their vehicles, of which full descriptions will be found in our back numbers (April 19th, 1902, and March 21st, 1903), have been fitted with engines having three cylinders. The new vehicle also differs from previous practice in several other important respects, and it is not only considerably lighter in relationship to its power, but it has been thoroughly brought up to date in accordance with the most modern practice.

The engine, instead of being placed transversely in the frame, as on most of the Brooke cars, in this model lies longitudinally beneath the bonnet in front. The car also more nearly follows the lines adopted by many other makers, in that a honeycomb radiator is employed for cooling the circulating water. The air is drawn through this cooler, not only by a belt-driven fan fixed immediately behind it, but also by another fan formed by the spokes of the flywheel. Other interesting features of the car are the change-speed-gear: the universal-joint fitted between it and the main-clutch: and the foot-brake, which is mounted inside the gear-box. In accordance with previous practice, the makers employ

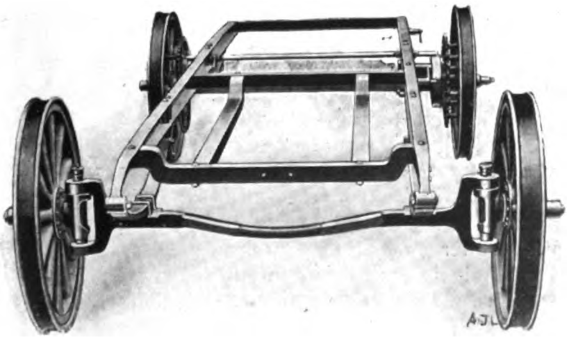


FIG. 2.—15–20-h.p. Brooke car. The main frame fitted with the wheels and axles.

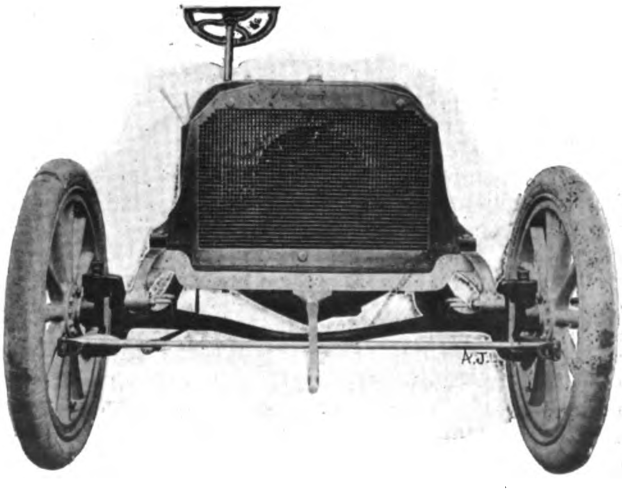


FIG. 3.—View of the 15–20-h.p. Brooke Chassis from in front.

chain and sprockets instead of spur-wheels for the gearing, and the required speed is introduced by jaw-clutches, the action of which is controlled from the gear-lever by a specially shaped cam, inside the box. Both the first and second-motion-shafts lie transversely, the former is driven by bevel-gearing from the clutch-shaft, and the latter also constitutes the differential countershaft from the ends of which the side chains pass to the rear wheels. Mention should also be made, in this general *resumé* of leading characteristics, of the combined automatic carburettor and automatic governor, which is the most recent development of the suction governor invented by this firm. The carburettor itself is now rendered automatic by the addition of a spring-loaded valve that regulates the admission of the auxiliary air, and the throttle-valve, which is automatically controlled by the suction in the induction pipe, is—together with that portion of the mechanism which enables the driver to regulate the normal speed—considerably simplified in construction. All the valves of the engine are mechanically operated, and two systems of ignition are fitted—a low-tension magneto, and a high-tension electric from batteries and coils.

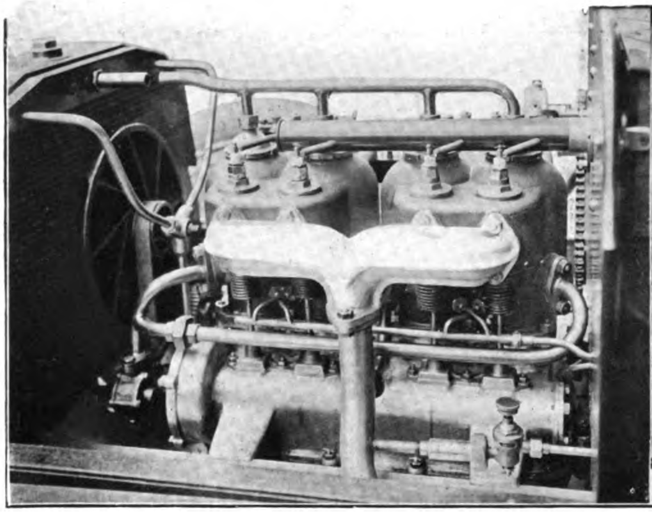


FIG. 4.—View of the 15–20-h.p. Brooke Engine, fixed in place in the Chassis—from the right side.

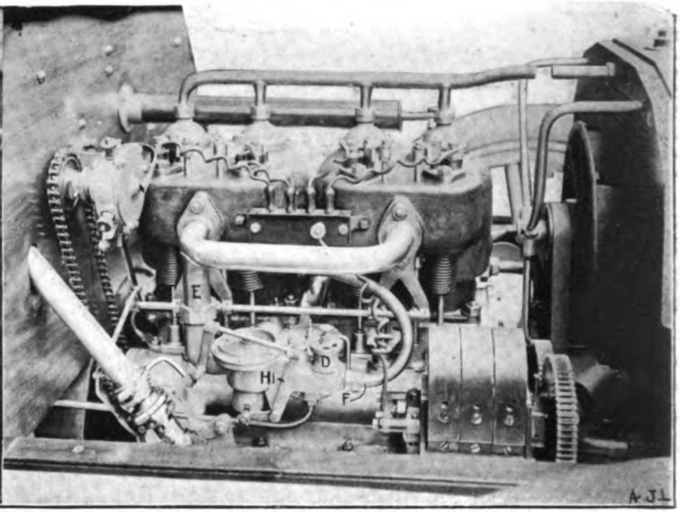


FIG. 5.—View of the 15–20-h.p. Brooke Engine, fixed in place in the Chassis—from the left side.

The first chassis has only just been completed, and has not, as yet, been fitted with its finished body. Its construction is very clearly shown in Figs. 1 and 3, and the main frame, together with the axles and wheels, in Fig. 2. The pressed steel frame has only one intermediate transverse member, and from it pass two inner longitudinal members which carry the engine and join the front member; this front member is not straight, but bends up at each end to join the frame, and thus fits the underside of the radiator, as seen in Fig. 3. Both axles are solid forgings; the front one is slightly bent downwards centrally, and the rear axle is practically straight. The frame is carried on the usual semi-elliptic side-springs, all of which are of considerable length; those at the rear lie outside instead of beneath the frame. The form of steering-head adopted will be noticed in Fig. 3, and the steering gear, which is irreversible, is of the worm type. The car has a wheel base of 7 ft. 8 in., and the track is 4 ft. 6 in.; all four wheels are of equal size, shod with 870 mm. by 90 mm. pneumatic tyres.

The engine is well seen in Figs. 4, 5, 6 and 7, the first two of these illustrations being reproduced from photographs taken by us after it was fixed in place in the car, and Fig. 6 showing it from both sides, detached from the chassis. The general design of the cylinders—which are cast in pairs—and of the crank-chamber—which also encloses the gear-wheels driving the cam-shafts—is rendered clear by line drawings in Fig. 7. The cylinders have a bore of 94 mm., and the stroke is 115 mm.; at the normal of 900 revs. per min., the engine develops about 20-b.h.p. and at a speed of 1,500 revs per min., about 25-b.h.p. The engine is in practice entirely controlled by two hand-levers, placed above the steering-wheel, the one regulating the time of ignition and the other varying the speed at which the suction governor comes into operation.

The inlet-valves are on the right, the exhaust-valves on the left, low-tension igniters form the inspection covers above the former, and high-tension ignition plugs are screwed into the covers above the latter; separate cam-shafts are, of course, fitted for the inlet and exhaust valves. The low tension igniters are operated by cams on the inlet cam-shaft, and the vertical rock-shafts through which the igniters are actuated pass through the cylinder castings, thus protecting them from injury and securing compactness. One of the low-tension igniters is shown in Fig. 8, where it will be noticed that the rocking arm has a large flat surface for the projection on the vertical rock-shaft to engage with. This is provided so that the vertical shaft shall continue to engage with it although moved longitudinally up or down; the time of ignition is varied by this movement because the ignition cams are then made to actuate the rock-shafts sooner or later as may be desired in the cycle of operations. This timing device is visible in Fig. 4, and is connected with the upper of the two small hand-levers which are fitted above the steering

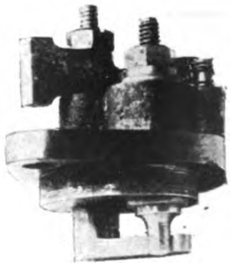


FIG. 8.—One of the low-tension Brooke igniters.

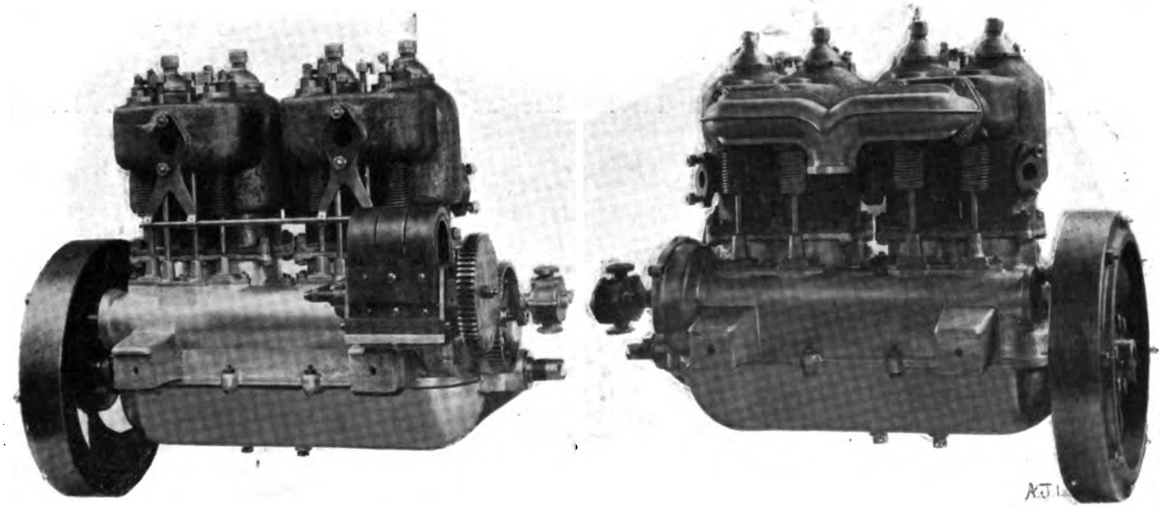


FIG. 6.—The 15-20-h.p. Brooke Engine, from the inlet-valve, and from the exhaust-valve sides.

wheel. Simultaneously with timing the low-tension ignition system, the high-tension system is also timed, for there is a connection between the levers that lift the vertical rock-shafts and the commutator—which is mounted in front of the dash beneath the bonnet. This commutator is driven by a chain off the rear end of the inlet cam-shaft, and is used in conjunction with trembler coils, fixed behind the dash, and the usual battery of accumulators.

The magneto, which is of the Simms-Bosch type, and runs at half the speed of the crank-shaft, is placed to the right of the engine, and is driven by exposed spur-wheels—one of which is made of fibre and phosphor bronze—from the front end of the inlet cam-shaft. The insulating wire from it is led to a distributing plug fitting as on the Mercedes engines, and the four wires to the igniters terminate in plugs that fit into its sockets. The length of the wires is in this way kept short, and they are not only easily disconnected for testing purposes, but are unlikely to get in the way. The high-tension wires on the other side of the engine are similarly protected, as seen in Fig. 5. Both ignition systems are controlled by neat metal-cased switches, which are fixed to the steering pillar, so that the driver can cut out either or both systems without moving from the seat.

There are large water-jackets around the cylinders, the cylinder heads and the valve chambers. The water is forced into the bottom of the jacket in each casting by a pump of the gear-wheel type, which lies to the left of the engine in front, and is driven from the front end of the exhaust cam-shaft. The water is led out at the top of

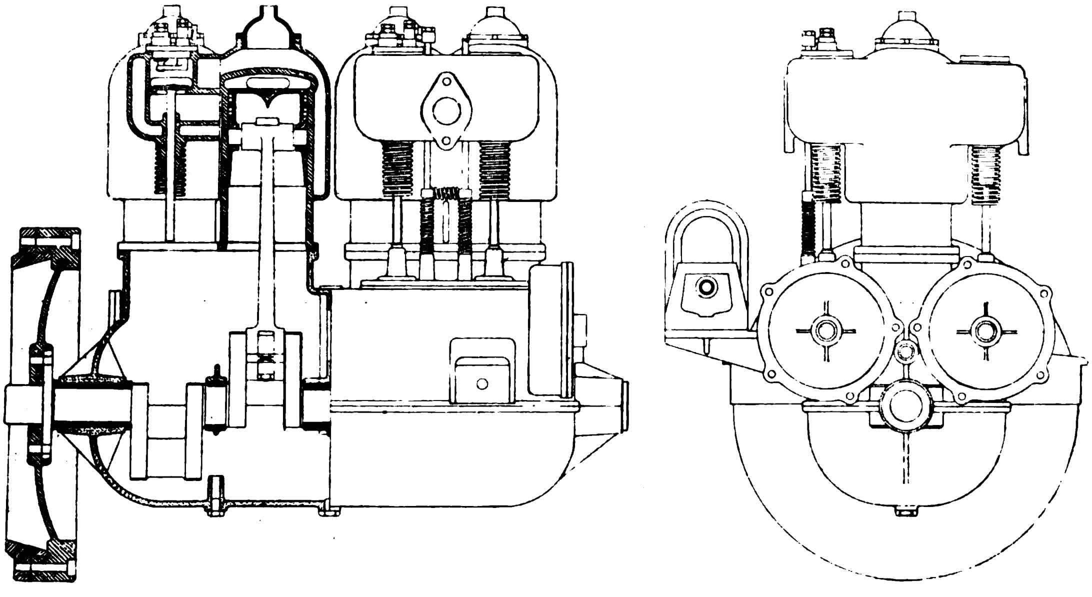


FIG. 7.—Side elevation (partly sectional), and end elevation of the 15-20-h.p. Brooke Engine.

the jackets above each of the four cylinders, and passes direct back to the top of the honeycomb radiator by a short branched pipe. The belt-driven fan behind the radiator is mounted in bearings which are attached to it, the rear end of its spindle being supported by three tubular stays as seen in Figs. 4 and 5. A wide, flat belt drives the fan from a pulley on the crank-shaft, and, as we have already said, the flywheel also acts as an additional fan to assist in creating a draught through the radiator.

The engine is fed with oil from a sight-feed lubricator on the dash, and a pressure is maintained in this lubricator by the exhaust gases in much the usual way—through the valve fitting which is visible in Fig. 5. The lubricator also has a hand-pump for forcing oil to the crank-chamber, and a pressure-gauge is fixed to indicate the pressure in the system. The same pressure valve maintains a pressure in the petrol tank, which has a capacity of about 9 gals., and is fixed at the back beneath the frame. Although not fixed when our photographs were taken, a small hand-pump is arranged on the dash for obtaining the necessary pressure in the tank initially.

In other respects the details of construction of this carefully designed engine practically follow well-known lines, and these are sufficiently clearly shown in our illustrations. Thus it will be noticed that the starting-handle fits direct on the front end of the crank-shaft, that an exhaust-pipe fitting leads the gases from all four cylinders to a common exhaust-pipe, and that the exhaust-box is placed transversely across the chassis just behind the change-speed-gear. The final exit from the silencer is through a horizontal tube which lies parallel with it, is stopped at its extreme end, and has a row of holes drilled through its underside so that the gases blow downwards on to the road.

(*To be continued.*)

Our photograph represents a 12-h.p. standard 1904 Brooke Car. Miss Redwood, who is at the steering-wheel, and a familiar figure to automobilists, is appearing at present in "The Darling of the Gods," the splendidly-staged play at His Majesty's Theatre.

MOST of the members of the Automobile Club are aware that Earl Russell possesses considerable talents in various different directions, and would, in all probability, have been successful in almost any of the learned professions which he might have chosen to take up. He is by profession an electrical engineer, but if he desired to practise at the Bar we feel convinced he would soon attain a leading position. Such, at any rate, is the impression left by reading the report of the case which Lord Russell brought against the War Office at the Basingstoke County Court. His car had been run into and damaged by a War Office lurry, steered—one can hardly say driven—by a youth who was learning his profession. Earl Russell's car had been brought to a stop when the War Office lurry ran into it, and it is, consequently, rather difficult to find grounds for agreement with the County Court judge, who held that the War Office was not responsible for the resulting damage. In mitigation of his adverse judgment, however, his Honour gave Lord Russell a testimonial as an advocate, for he declared that his lordship's conduct of his own case entirely negatived the old proverb about the man who is his own lawyer, for never, he said, could he remember a case conducted with greater ability or with more uniform good humour from start to finish.

THE LATEST DE DION-BOUTON PETROL CAR.—PART II.

REFERRING to Figs. 10, 11, and 12,—showing the latest carburettor—the mixing-chamber, J, has the float-feed-chamber, H^7, fitted about its base, and it not only contains the two spray-jets, H^5, but also a partition-casting, J^4, and a pair of cylindrical auxiliary air-valves, J^6. The auxiliary air-valves, J^6, are connected together at the top by a yoke, J^5, and there is a spindle, J^1, arranged inside the cap, J^3—at the top of the casting, J—in such a way that the cylindrical valves, J^6, are both raised or lowered as the spindle, J^1, is turned about its axis. The valves, J^6. regulate the normal richness of the mixture, and are operated from a small hand-lever (J^2) (near the steering-pillar), which is connected by a system of levers and rods with the spindle, J^1. The float-feed-chamber, H^7, receives its supply of petrol through the pipe fitting to which the petrol feed-pipe is connected by the union, H, and a loaded needle-valve, H^1, fits loosely inside this pipe-fitting and normally shuts off the feed by the needle at its lower end. The float, H^4, is annular in shape, and it surrounds the lower portion of the casting, J. Beneath it, in the chamber, H^7, are a pair of pivoted levers, H^3, which at their one ends engage beneath the head of an adjustable screw, H^2, which is fitted into the top of the needle-valve, H^1. These parts are so arranged that as the level of the petrol falls the weight of the float, H^4, on the levers, H^3, causes them to raise the needle valve, H^1, as in most float-feed carburettors. As seen in Fig. 12, the jets, H^5, lie inside that portion of the casting, J, which is surrounded by the float, and they are, of course, in open communication with the float chamber. The partition casting, J^4, fits down inside the casting, J, is slipped into place from above, and is prevented from turning round (when in place) by a set screw. This casting forms a pair of cylindrical chambers, the lower ends of which surround the two jets, and it will be noticed (1stly) that ports are cut in their walls opposite to the air inlet passages in the casting, J; (2ndly) that they do not extend down quite so far as the bottom of the jets; and (3rdly) that other ports are formed in their walls opposite to the induction-pipe passages in the casting, J. The casting, J^4, completely divides the lower and central portions of the casting, J, diagonally across, and, therefore, it not only forms cylindrical mixing chambers above and around each of the jets, but it also provides separate passages between itself and the casting, J, for the main air supply to pass down around it, and then up through it, past the jets. Were the lower ports in the casting, J, left open, the entering air would not only be free to pass around the jets through the two mixing chambers, but it could also go direct through these ports into the mixing chambers. A certain proportion of air is, in fact, permitted to find its way direct through them, but the amount is controlled by the cylindrical valves, J^6, which lie inside the mixing chambers, and have corresponding cut-off ports, J^7, formed in them. The main air supply from the pipes, K^1, enters through the lower throttle-valves which are fitted in each of the castings, K, and then passes in the manner already explained to each carburettor separately. A portion of it is carburetted

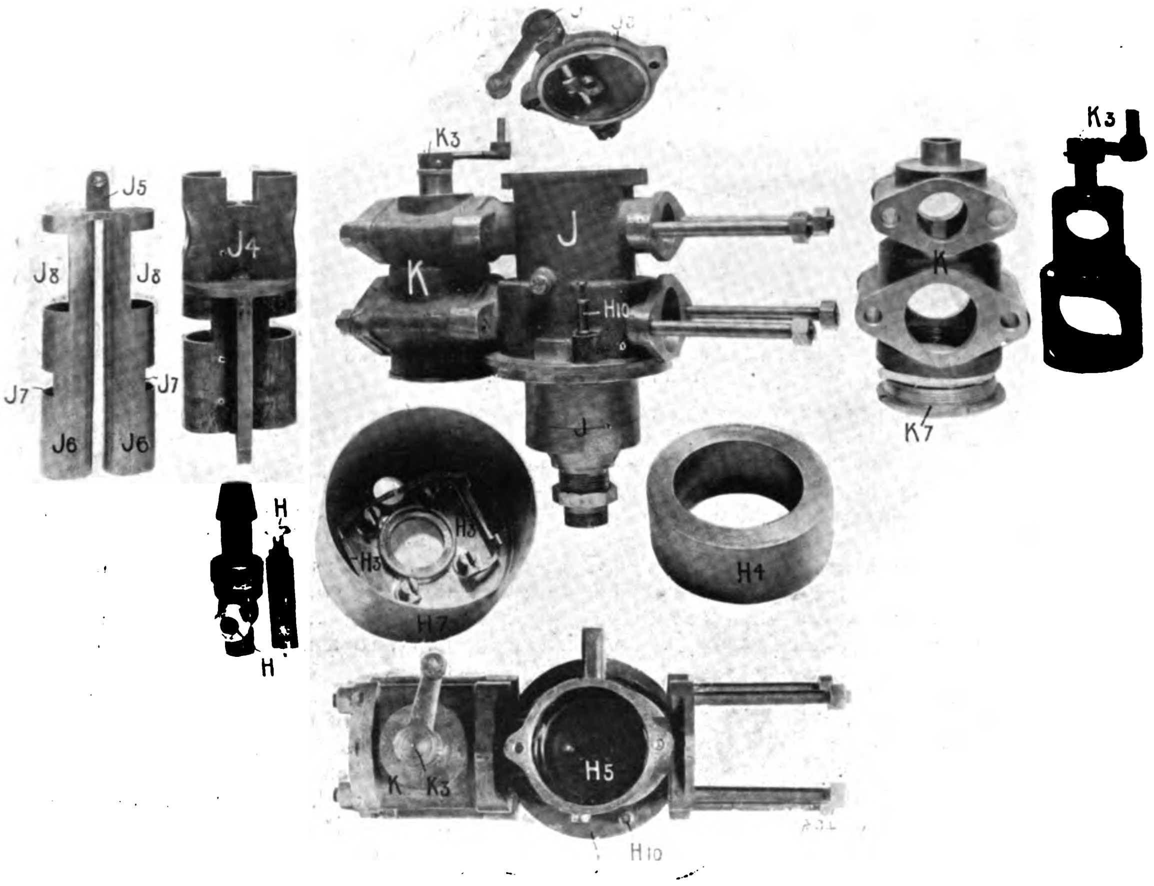


FIG. 11.—The various parts of the new double-jet De Dion Carburettor.

by passing up around the jets, and the remainder is allowed to take a short cut into the mixing chambers above the jets. The whole of it then flows up through the cylindrical valves. J^6, inside the casting, J^4, and finally finds its way through the ports, J^9, which are always wide open. and through the corresponding ports in the casting, J^4, past the upper throttle-valves in the castings, K, to the induction pipes, K^2, leading to the cylinders.

The double valves, K^6, not only regulate the volume of the explosive charge, but they also enable the carburettor to maintain an approximately constant richness of mixture by maintaining the required degree of vacuum in the mixing chambers to ensure a correct quantity of petrol flowing through the jets. The two throttle-valve spindles, K^3, are connected together so as to work in unison by the rod, K^4, as seen in the illustrations, and they are coupled up with a third engine-regulating hand-lever (K^5) on the steering-pillar, so as to be under the control of the driver.

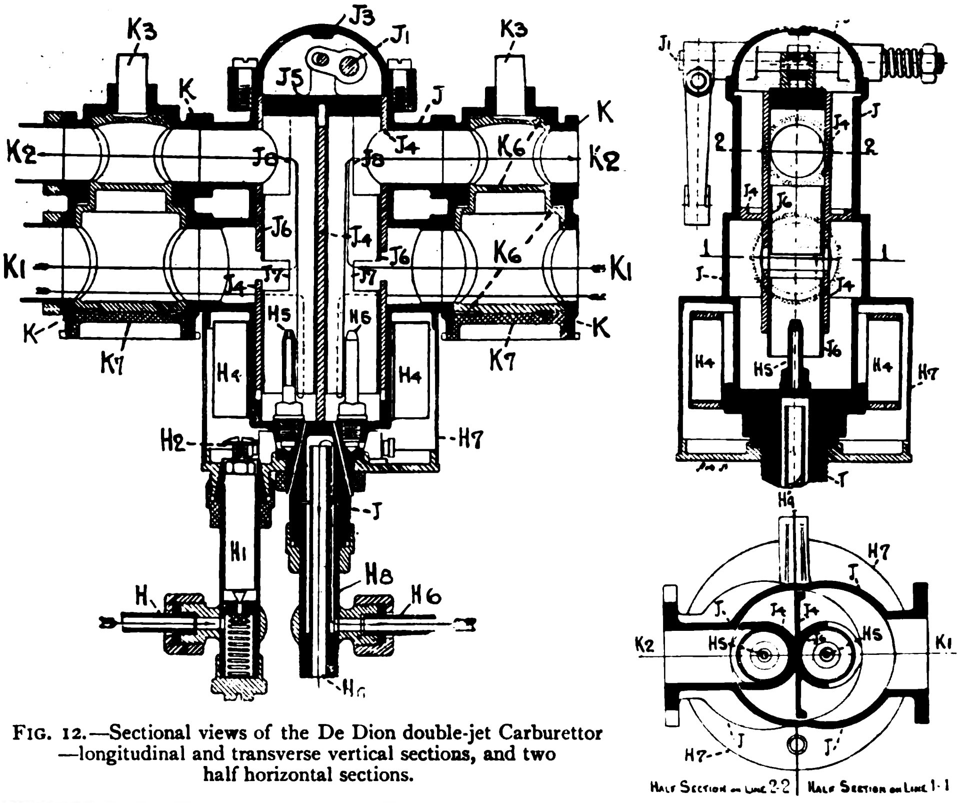


FIG. 12.—Sectional views of the De Dion double-jet Carburettor —longitudinal and transverse vertical sections, and two half horizontal sections.

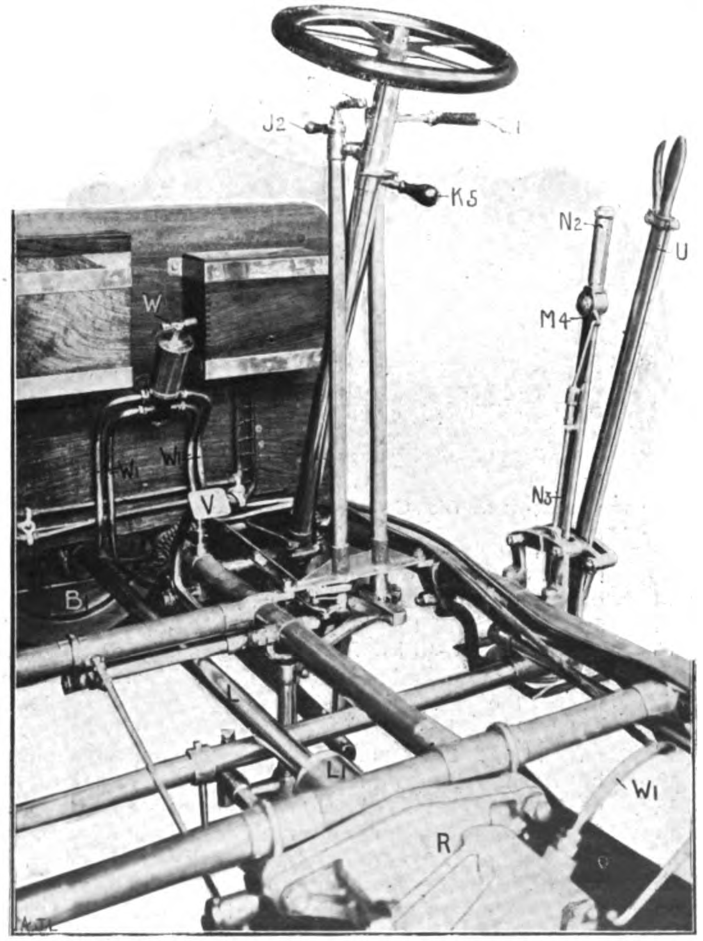


FIG. 13.—Central portion of the 10-h.p. De Dion Chassis, showing the regulating levers, the brake pedal, and the fittings on the dash.

Other details in connection with the construction of this carburettor are clearly shown in our illustrations. Thus there is a small agitator, H^{10}, fitted into the casting, J, immediately above the float, H^4, so that the float can be depressed by hand if at any time necessary. The hot-water chamber, to which reference has already been made, is formed in the base of the casting, J, and is of small size, the water-pipe fitting, H^8, serving to lead the water in through the pipe, H^6, and out again through an inner concentric pipe, H^9. Flooding of the mixing chamber, through a leaking needle-valve on the petrol supply, is also guarded against, two small holes being drilled, as seen in Fig. 12, to allow it to escape if it should tend to collect. A small filter is, moreover, introduced in the petrol-feed immediately beneath the needle-valve, H^1, the filter-gauze being held up in place by a spring and being fitted so that it can be easily removed for cleaning purposes. All the various portions of the carburettor are easily accessible should they require attention; most of them are shown so taken to pieces, and are easily recognisable from the respective indicating letters assigned to them.

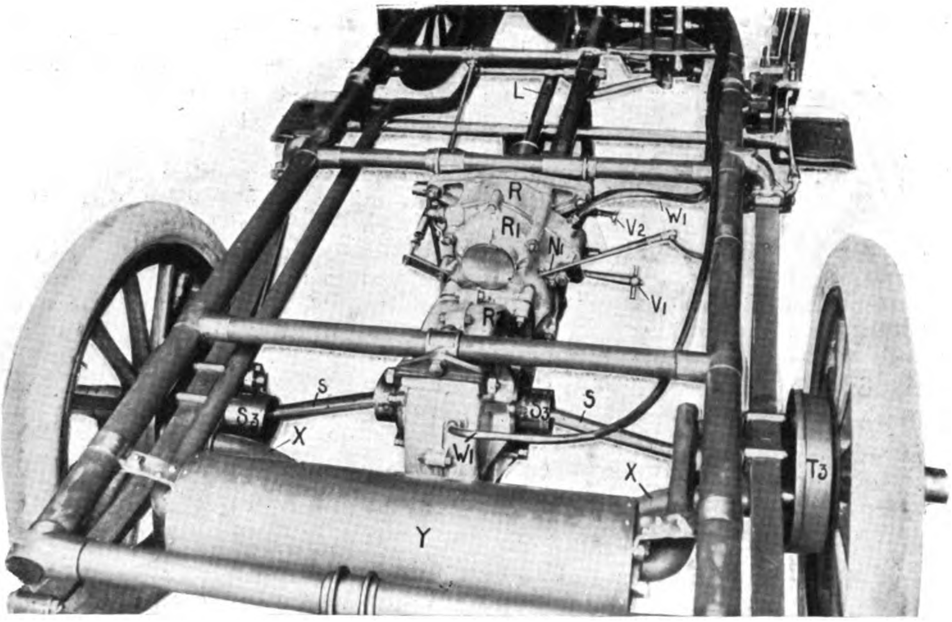


Fig. 14.—Rear portion of the 10-h.p. De Dion Chassis, showing the Change-Speed-Gear, and the Cardan-jointed Differential Shafts.

The engine is not fitted with an automatic governor c any kind, but is under the complete control of the driver from the three small hand-levers on the steering-pillar, and from the brake-pedal—all of which have already been referred to, and are visible in Fig. 13. In actual practice, the small lever, J^2, is adjusted to suit atmospheric conditions, and merely enables the driver to vary the proportion of air which is carburetted to that which dilutes the mixture thus formed; it therefore does not require any constant attention. The lever, E^9, permits the time of ignition to be altered in order to conform to different engine speeds, and the lever K^5, as we have seen, has the direct effect of throttling the mixture in such a way that a constant richness is at the same time maintained. The control provided by the action of the brake-pedal, V, on the exhaust-valve-regulator is chiefly used when driving the car, for it has the effect of gradually reducing; the power

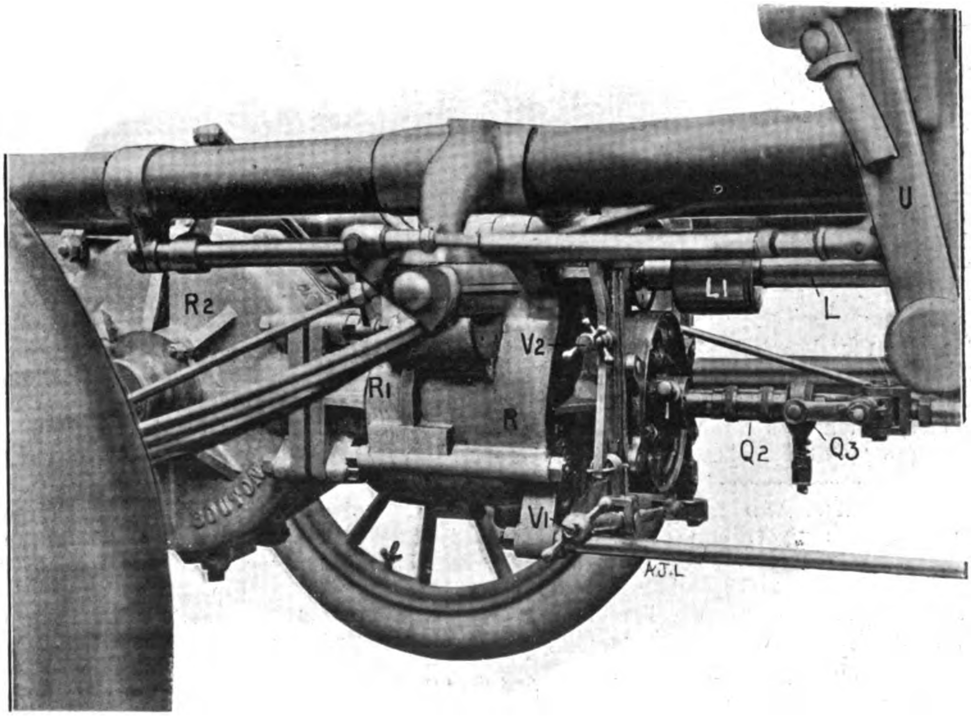


Fig. 15.—View of the Gear-box and the adjustable foot brake from the right side of the 10-h.p. De Dion Chassis.

of the engine, by retaining a greater or less quantity of burnt gases in the cylinder, before the pedal finally brings the mechanical brake into play. The foot-pedal, alone, therefore furnishes the driver with a very full range of control over the car.

The whole of the transmission gear of the 10-h.p. car is well shown by comparing Figs. 13, 14, and 15 with Fig. 3 which appeared last week. The change-speed-gear, together with the differential, form a single unit, and are enclosed in neatly designed aluminium casings which are bolted together, and are rigidly secured by three clip-brackets to two of the cross-tubes towards the rear of the main frame. The change-speed-gear lies immediately in front of the differential, and has a first-motion-shaft fitted immediately above a second-motion-shaft.

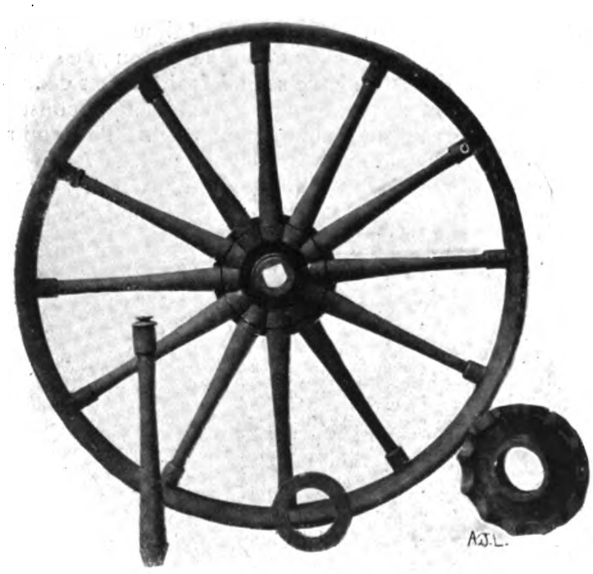
The power is transmitted from the crank-shaft of the engine to the forward end of the first-motion-shaft by a long propeller-shaft, L, having cardan joints at each end. These joints are similar to those which will be shown and described presently in conjunction with the back axle, and are rendered dust-proof by neat metal casings, each of which is held in place by a single spring-catch. The joints are not only equivalent to universal joints of the ordinary well-known type, but they also allow for a certain amount of longitudinal movement of the shaft, L, although any play in this direction is normally prevented from taking place by a spiral spring fitted inside the end of the crank-shaft; the spring exerts a steady pressure tending to force the propeller-shaft in a rearward direction.

The casing surrounding the change-speed-gear is formed by two aluminium castings, R and R^1, each of which provides an end bearing for the two shafts.

(*To be continued.*)

A STEEL WHEEL FOR HEAVY CARS.

A NOVEL design of wheel, intended for use on heavy motor cars, is that introduced by Messrs. Lord and Co., and known as Lord's tubular wheel, the construction of which is entirely of steel. The spokes, which are of tubular construction, are recessed into the nave and retained in place by the detachable cap, seen to the right of our illustration; a large nut (also shown) keeps the latter in position. The spokes are fixed to the rim by nipple fastenings, which pass through the rim from the outside, and screw over the spokes.

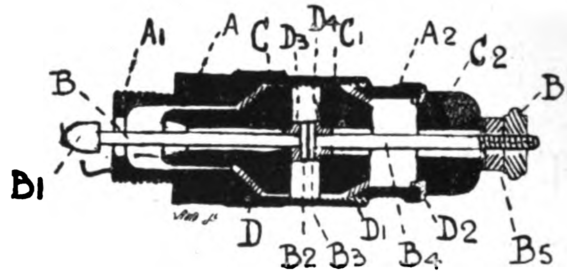


MESSRS. CARLESS CAPEL AND LEONARD have forwarded us the fifth or 1904 edition of their book, "Petrol: What it is, Where it may be Obtained, &c." The information provided is revised and brought up to date, and we are glad to find that the list of agents storing Messrs. Carless Capel and Leonard's "petrol," of which word, as the pamphlet reminds us, they were the introducers, has largely increased, which proves the growth of the automobile movement, and will be a convenience to the numerous car drivers in the country.

THE BURLINGTON IGNITION PLUG.

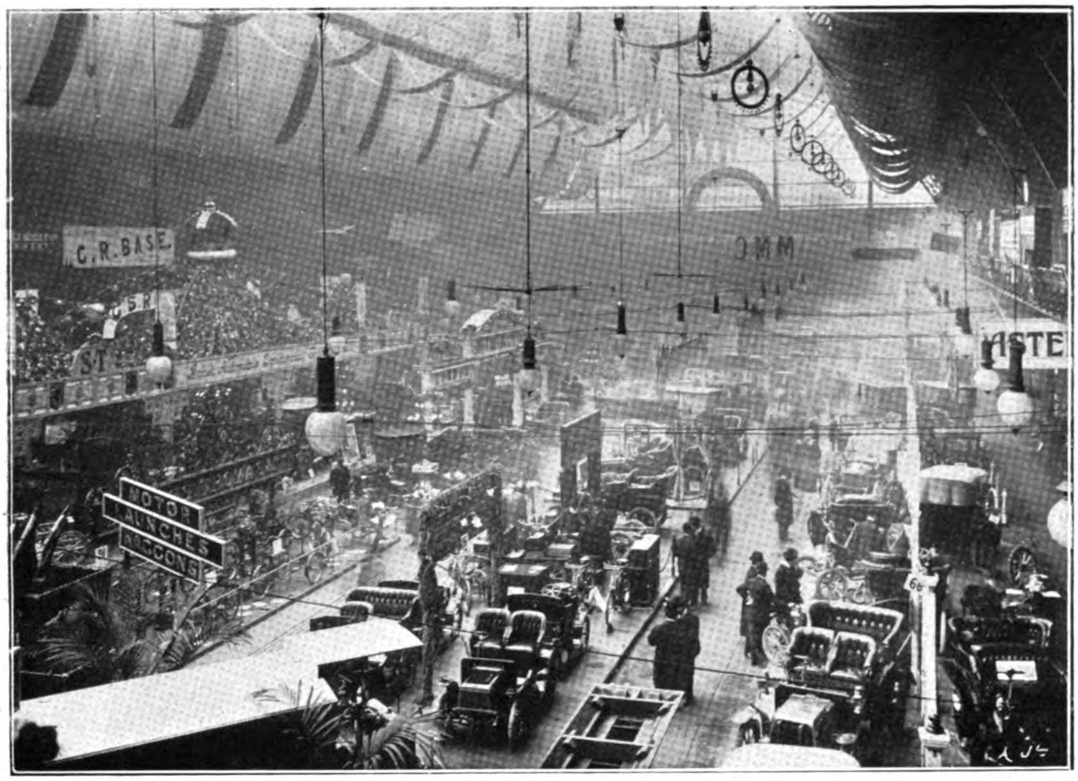
AN improved design of sparking plug has just been placed upon the market by Messrs. S. F. Edge and Co., of which we reproduce the above section.

A represents the brass fitting which screws into the cylinder at A^1, and is lapped at the opposite end to receive the screwed gland, A^2. The insulated rod is in two pieces, of which the lower half, B, terminates in a semisphere, B^1, at one end, and the flat collar, B^2, at the other. The collar, B^2, makes a butt joint in a corresponding collar, B^3, which forms one end of the rod, B^4, the other end being screwed to receive the terminal nuts, B^5 and B^6. C, C^1, and C^2, are porcelain supported on asbestos washers, D, D^1, D^2, D^3, and D^4. One of the chief features of the design of this plug is the precaution taken to prevent the leakage of the cylinder gases, these, as will be seen from the section, having to pass through three consecutive joints on their way to the atmosphere. The tubular construction of the lower porcelain, C, is such as to give an air insulation, and to prevent carbonisation. The sub-division of the porcelain into three pieces minimises the risk to fracture through their unequal expansion with the metal.



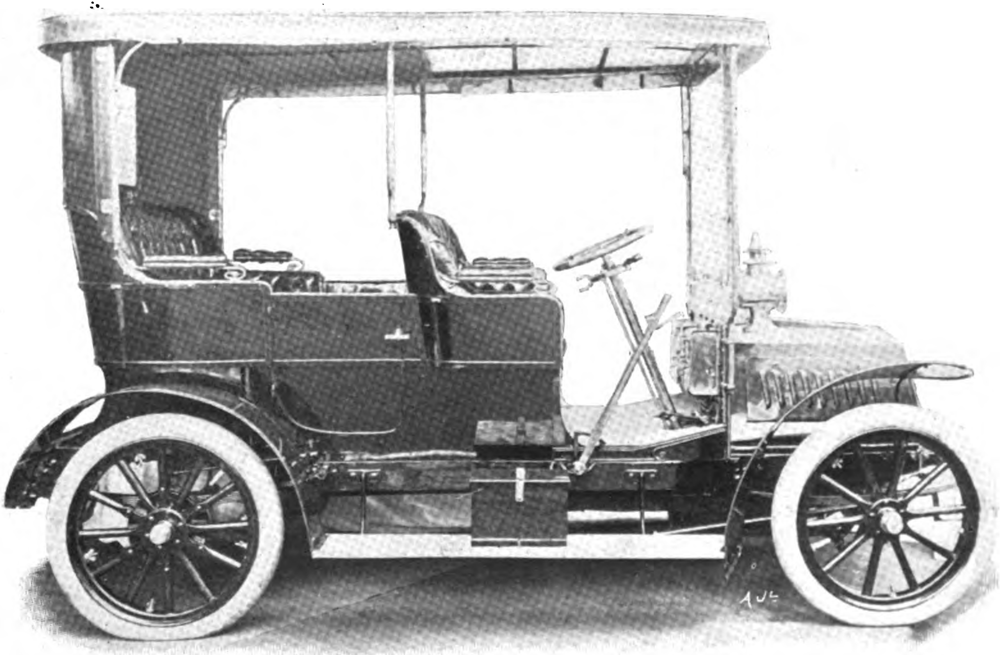
"HURLED from a Motor Car" is the sensational heading given to an accident which took place at the Kursaal in Lausanne, when an American was "looping the loop" on a "car" made to look like a motor car. Something went wrong with the track, with the result that the performer came down from the top with a crash. We are hardly surprised to hear that the Swiss Press are loudly demanding the prohibition of this type of performance, and, for our part, we strongly protest against the use of such misleading headings to describe an absurd and dangerous performance of this nature.

MESSRS. CORDINGLEY & CO.'S AGRICULTURAL HALL SHOW.

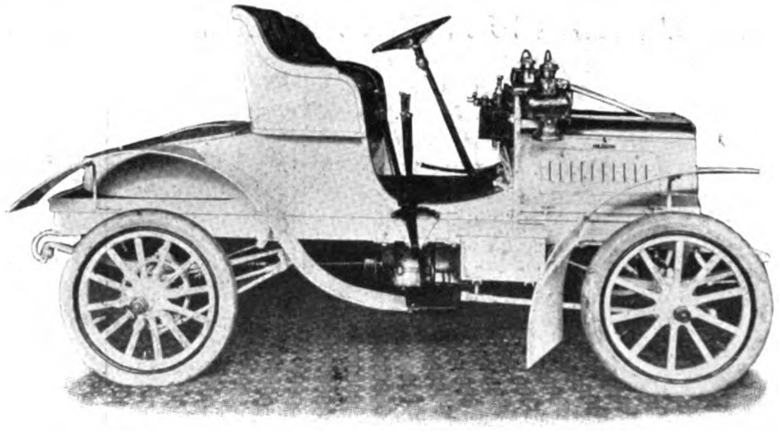


General View of the Great Hall at Messrs. Cordingley and Co'.s Exhibition.

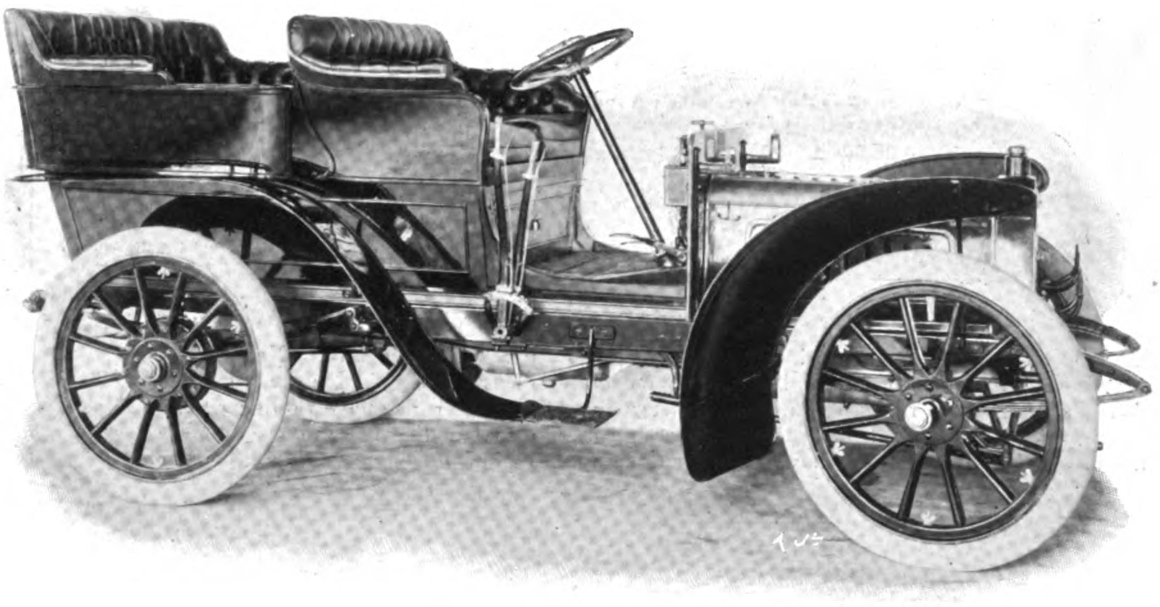
ONE Exhibition naturally begins to look very much like another when such events follow at all closely upon each other's heels, and, therefore, as we anticipated last week, the Show at the Agricultural Hall is to a very great extent a repetition of those which have been held comparatively recently. Not that it is otherwise than pleasant to again see the many good models which skill and enterprise have produced for the present year, but only that there is, in consequence, less to record in the way of novelty and less to say concerning tendencies



A Darracq Double-Phaeton, with Side Entrance and Canopy Top.



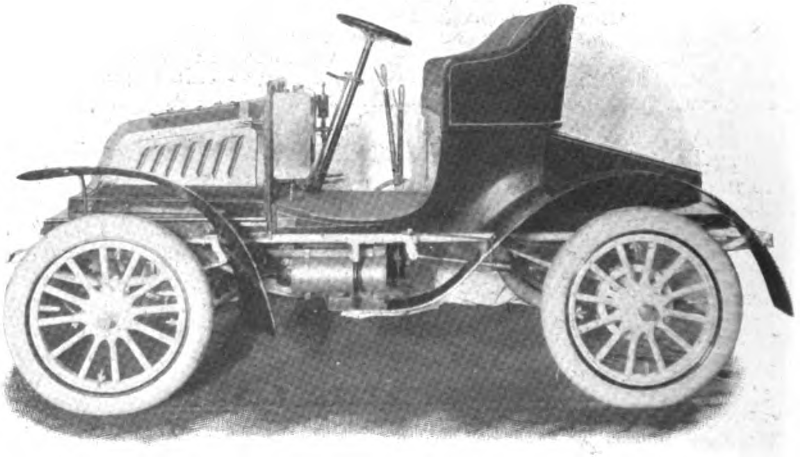
THE "VOUSÉMOI" CAR.—The "Vousémoi" two-seated car is of more powerful build than other two seaters of similar design but lower price. A 10-h.p. 2-cylinder engine, with mechanically-operated inlet-valves, is fitted to this car, and drives the back-axle through a propeller-shaft. The change-gear fitted gives three forward speeds and one reverse.



A 20-h.p. Talbot Standard Tonneau.

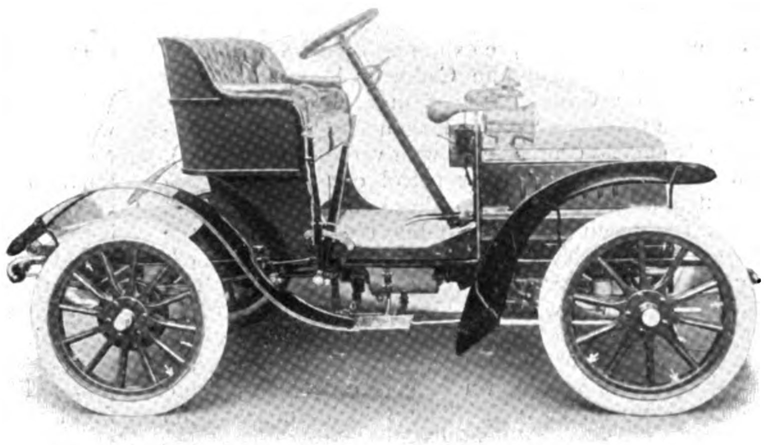
toward further development Fortunately, any feelings of *ennui* which may be felt by some of the exhibitors—and which we may be excused if they are to a certain degree shared by ourselves—are evidently far from being experienced by the general and the motoring public, for the Exhibition which closes to-day (Saturday) has been extremely well attended, as it has undoubtedly deserved to be. Never before have there been so many exhibitors, and on no previous occasion has there been so great or interesting a variety of exhibits. Just as the Crystal Palace Show failed to rival the Paris Salon from an artistic point of view, so this Exhibition is, as was only to be expected, inferior to the Palace Show so far as decorative effect goes. No one, however, would expect to find a fairyland in Islington, and most of those journeying thither this week must, on the other hand, have fully appreciated the greater rapidity with which it is possible to "do" the Show.

Considering that this is the last of the large Exhibitions to be held this winter, Mr. Cordingley must be congratulated upon having gathered together as many interesting and attractive novelties as he has succeeded in doing, for there are quite a number of vehicles of various kinds that have made their first public appearance in this country, and several of them are entirely new to the world. The chief sensation, of course, in the way of private vehicles is the Hutton chassis, which has been the pole-star of all motoring visitors, at any rate, since it arrived there. An illustrated description of it—as also of the new Brooke chassis, which is another British-built *débutante*—is given by us in another column this

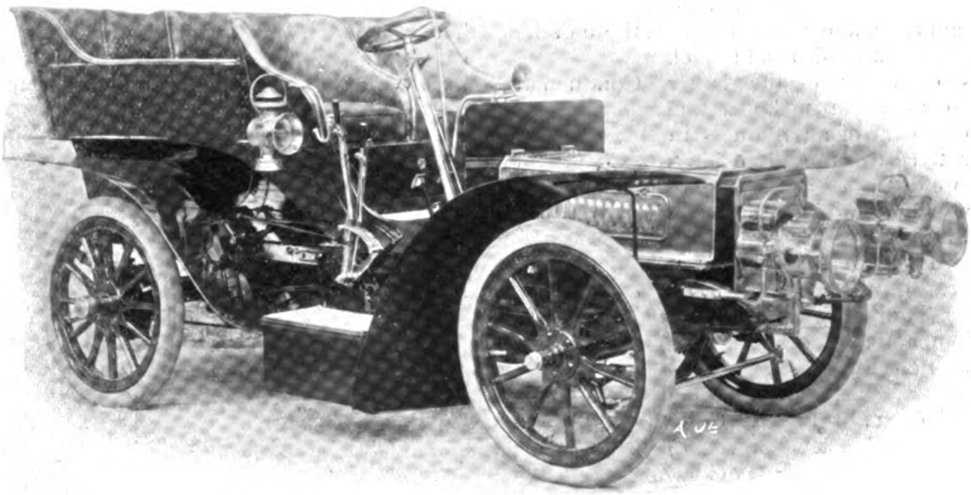


THE "MERCURY SIMPLEX."—The "Mercury Simplex" Light Car, shown by the Anglo-French Motor Syndicate, is fitted with a 6-h.p. De Dion-Bouton water-cooled engine which is regulated on the exhaust. Sliding spur-wheel change gears are employed to give three forward speeds and one reverse, with a direct drive on top speed. The power is transmitted to the back axle by propeller shaft. The cooling water is carried in a tank under the bonnet, while the radiator is fixed in front under the frame.

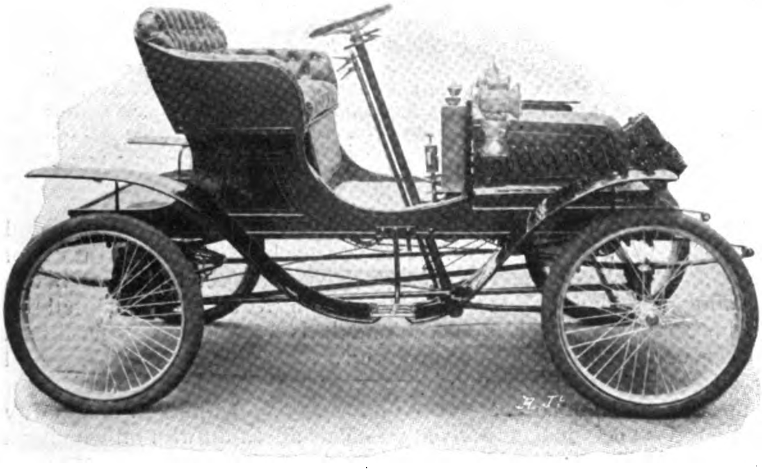
week, so that we need not refer further to it here. Then, too, Messrs. Richardson and Co., of Lincoln, show the chassis of a new 4-cylinder car of their own construction, and there are, in addition, quite a large number of "light" cars, and three-wheelers of the glorified cycle type, which are now on view for the first time. Amongst the heavy vehicles, there is the most representative collection of steam lurries that we have seen at any Exhibition up to now. It includes two or three entirely new productions of makers whose names have not been known by the public in this connection hitherto, and of these we hope to give some particulars later on in this report.



THE "RICHARDSON" LIGHT CAR.—The Richardson Light Car is fitted with a 6½-h.p. Aster motor. The change-gear, which is of the sliding spur-wheel type, gives three forward speeds and one reverse; the drive to the back axle is by propeller shaft. The frame of the chassis is of tubular construction.



A 16-h.p., 4-cylinder, "Coronet" Petrol Car, with 3-seated Tonneau.



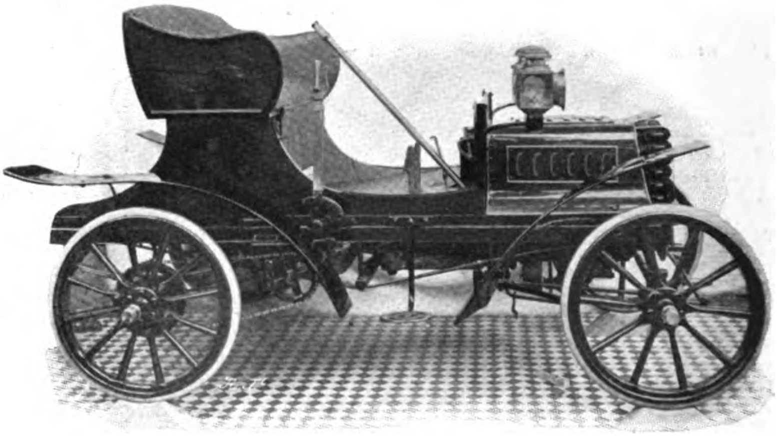
THE "AUTOMOTOR" VOITURETTE. — The "Automotor" Voiturette, manufactured by the Automobile Components, Limited, is fitted with a 4-h.p. vertical water-cooled engine. Two forward speeds are provided, and the lever which operates them also disengages the friction clutch. A single chain transmits the power to the back axle in the car shown, but a belt drive can be fitted for those who prefer this transmission. This voiturette is one of the very light vehicles of this class.

So complete, indeed, is this section of the Show that one almost regrets that the few other well-known makers, who are conspicuous by their absence, such as the Thornycroft Company, the Coulthard Company, and the Straker Company—because they are under bond only to exhibit at the Crystal Palace Exhibition—are not also represented in the Hall. Amongst the steam lurries which are there may be mentioned those of the Lancashire Steam Wagon Company, Fodens Limited, the Mann Steam Wagon Company, the Yorkshire Wagon Company, Savage Bros., all of which are already well known, and the lurries of the Hercules Wagon Company, Messrs. Robertson and Son, of Fleetwood, and J. and F. Howard, of Bedford, who are exhibiting new types; the small steam tractors made by Messrs. Tasker and Sons and Messrs. Wallis and Steevens are also again in evidence. Several petrol lurries, too—though amongst these one misses those of the Milnes-Daimler Company (also signatories to the bond referred to)—are also on view, so that the commercial vehicles are well to the fore on this occasion. The most noticeable of these petrol wagons are exhibited by Stirling's Motor Construction Company, the Cadogan Motor Company (Wilkinson de Cosmo), the Motor Car Emporium, Ltd. (Brillié), and the Empire Hagen Motor Wagon Company, of Sheffield (the Hagen, with variable speed-gear). Quite a number of the larger petrol cars of all-English construction, in addition to those briefly mentioned above, are again shown, notably the Maudslay, the Duryea, the Siddeley and the National (Rose Brothers). The Putney Motor Company exhibit their Travellers' Brougham, which has already been illustrated in our columns. One of the latest Roots cars, as also the complete chassis of the single-cylinder 5-h.p. type, is staged by these well-known makers of vehicles using ordinary lamp oil as fuel. The vehicles made by the Coronet Motor Company, of Coventry, are also of all-English construction. These makers are not only now turning out engines of various sizes, but also building complete cars of up to 16-h.p., of which we shall have more to say shortly. In the way of steam vehicles for private use, the Cremorne Company and Messrs. Bailey and Lambert are the only exhibitors. Both types of car shown by them are made in this country, those of the latter firm being the Turner-Miesse model.

The makers of many of the larger Continental petrol 'private cars again make a fine show, and a good deal of attention is in particular attracted to the Hotchkiss chassis, which we described at the time of the Paris Salon. Others which are also on view at that Show include the Talbot, Brouhot, Chenard and Walcker (Weston Motor Syndicate), Rochet-Schneider (Morgan Donne), Toni Hubert (Paddington Motor Company), Regal (Selbach, Limited), De Dietrich (Burlington Carriage Company), Germain, Pipe, Corre (O'Neill and Co.), Prunel (Normal Powder Company), and Cottereau (Macleod and Co.) cars. The Burlington Carriage Company also have one or two of the De Dietrich-Bugatti chassis, which are of very different design to the better known De Dietrich models. An illustrated description of them was given by us on April 18th last; their most striking feature is the curious construction of the cylinders and the jackets on the engine. The Cannstatt Automobile Supply Association make a fine display with the new Mercedes vehicles, of which they show quite a large number. The Elsworth Automobile Company have a Spyker chassis, similar to that dealt with by us recently, and Fiat Motors, Limited, are once more well in evidence. The Cadogan Garage and Motor Company have a 24-h.p. Wilkinson de Cosmo car of the live-axle type, the engine on which is fitted with variable lift inlet-valves and with the automatic carburetter, of which a sectional illustration is now given; the drawing is self-explanatory, and it will be noticed that the spring loaded auxiliary air valve, D, is rendered more sensitive than usual by the diaphragm, D¹, to which it is attached. The Automobile Components Company have a variety of cars of various sizes, as well as of the engines, which they supply separately.

Additional interest is attached to the exhibit of Herald petrol cars by Bailey and Lambert, Limited, because it is this make of chassis which is being used for the self-propelled hansom cabs that have been introduced for public use on the London streets, and another stall which has proved very attractive is that of the Lancaster Motor Garage, who are exhibiting the "Mass" chassis for the first time; this vehicle is of unusual construction in many respects, but we must defer our description of it for the moment. The Beaufort Motor Company and the Mohawk Company (Mohawk Manon) also once more bring their cars to the notice of the purchasing public.

Quite a number of cheap light cars are to be seen on the various stands. The general tendency in the outward design is still towards the lines of a miniature high-powered car. The majority of these voiturettes are fitted with single-cylinder vertical high-speed engines. Of the horizontal type, the extremely well-built Siddeley Light Car is almost the sole exhibit; only one other car was observed with a horizontal engine, this being a very miniature car called the Bijou, which is shown by the Protector Lamp and Lighting Company, Limited. The transmission adopted on most of the light cars is of the propeller type, such as is adopted on the Baby Peugeot. The Speedwell, Royal Enfield, and Richardson, are light cars having propeller-drive and a three-speed gear, as also has the Mercury Simplex, exhibited by the Anglo-French Company, and the Pelham car, shown on the Bailey and Lambart stand. The Horbeck Minor is a light car of the propeller-shaft type, having a special form of bevel-wheel on the rear-axle. The Regal car, exhibited by Messrs. Selbach, Limited, is another propeller-driven car, having a two-speed gear. Alldays' light car, and the "No Name" vehicle, made by the Horley Motor Company, are also to be seen. Although the majority of the chain-driven light cars are fitted with only a single chain, after the manner of the Cottereau voiturette, which was very fully described in THE AUTOMOTOR JOURNAL of October 3rd and October 10th, 1903, two exceptions are to be noticed in the Star and Thor cars, both of which have a double-chain drive from side sprockets. A feature of the Thor car is that it is



THE "THOR" CAR.—The "Thor" Car is fitted with a specially roomy two-seated body, is driven by a 6–8-h.p. Simms' Engine. Simms' Bosch Low Tension Magneto Ignition is employed. Three forward speeds and one reverse are fitted, and the drive on to the road wheels is by double side chains. The circulation of the cooling water is forced by a rotary pump through a radiator in front of the bonnet. Tiller steering is shown on the car photographed, but the fitting of this or wheel steering is optional on the part of the purchaser.

fitted with magneto ignition. Both the above cars are fitted with a three-speed gear. Among those fitted with only two speeds, but having a central chain-drive, are the Holdsworth car, exhibited by the Light Car and Motor Engineering Company; the Clyde light car, shown by the Clyde Cycle and Motor Car Company, which uses a Renolds silent chain (a description of this car appeared in The Automotor Journal of November 19th, 1903); and the Automotor light voiturette, exhibited by the Automobile Components, Limited. The Gordon and Arbee light cars are fitted with vertical slow-running engines instead of the high-speed De Dion type, usually employed on this class of car. Reynold Jackson and Co. show on their stand a Jackson dogcart, and make a feature of its construction, which enables the chassis to be very readily exposed. The gear-box fitted on most of these light cars is of the sliding-spur-wheel type, although, when only two speeds are provided with no reverse, a simple jaw clutch is sometimes adopted, as on the Gordon Miniature. The Frick car, which is exhibited by Dougill's Engineering, Limited, is fitted with a variable speed gear of the friction disc type.

There are very few exceptions to the tubular construction of frame; notably, of course, is the Siddeley, with a frame of pressed steel, while a few others use ash frames reinforced with steel. Water-cooling on even the smallest cars is invariably adopted, and a number of the cars are provided with forced circulation. Although the very lightest of these small voiturettes are shown with wire spoke wheels, they have almost quite disappeared on the "light" car of more substantial build, which is now nearly always fitted with Artillery wheels, and this adds considerably in completing its resemblance to its prototype—the high-powered touring vehicle. Of the three-wheeled vehicles fitted with a fore-carriage, the Garrard has many points of interest. A 5-h.p. engine is fitted, and also a gear-box of the sliding-spur-wheel type having three speeds. The final transmission on to the rear-wheel hub is by propeller-shaft and worm-drive. Messrs. Bayliss Thomas and Co., Ltd., also show an Excelsior motor tricycle and fore-carriage with 4-h.p. motor, with direct belt drive to the rear wheel. The Bowden Patents Syndicate and the Rex Motor Company also show machines of this description, the latter having a 4-h.p. engine driving through an enclosed chain.

THE AUTOMOBILE CLUB COMMITTEES FOR 1904.

Last week we published the names of the newly-elected committee of the Automobile Club, and we now append the list of the President, Vice-Presidents, various chief officers, the Executive Committee, and the sub-committees which have been elected for various specific purposes. Lieut.-Colonel Holden, R.A., F.R.S., was elected Chairman at the first meeting of the Committee. It will be seen that in addition to the previously existing committees there have now been established a Public Policy Committee, of very influential membership, and a strong Expert and Technical Committee, while on the Marine Motor Committee such universally celebrated marine engineers as Sir John Thornycroft and Mr. A. F. Yarrow are included. The existence and influential membership of the Public Policy Committee will, we have every reason to hope, be successful in influencing the relations between the club, as representing the automobile movement, and public bodies and authorities in a highly beneficial direction.

President.—The Duke of Sutherland.

Vice-Presidents.—The Right Hon. the Earl of Onslow, G.C.M.G.; Lord Dudley, Lord Lieutenant of Ireland; Lord Stanley, M.P.; and Sir David L. Salomons, Bart.

Executive Committee.—*Ex-officio members*:—Chairman: Lieut.-Colonel H. C. L. Holden, R.A. Vice-Chairmen:—Lieut.-Colonel Mark Mayhew, the Hon. Arthur Stanley, M.P.; Sir David Salomons, Bart.; Hon. Treasurer: Paris E. Singer. *Elected members*:—The Right Hon. Earl Russell, Hon. John Scott Montagu, M.P.; Dr. Boverton Redwood, Messrs. Henry Norman, M.P.; R. E. Phillips, Alfred F. Bird, James F. Ochs, Claude Johnson, E. H. Cozens-Hardy, J. D. Siddeley, Lionel de Rothschild, Wilson Noble, and Major Lindsay Lloyd, R.E.

Finance Committee.—Messrs. Edward Manville (Chairman), Paris E. Singer (the Hon. Treasurer), George Montagu, M.P.; Lionel de Rothschild, G. C. Ashton Jonson, Major Lindsay Lloyd, Captain H. H. P. Deasy.

Foreign Relations.—Sir David Salomons, Bart. (Chairman), Sir Edgar Vincent, K.C.M.G., M.P.; Hon. Stuart Bouverie, Capt. Sir Wroth Lethbridge, Bart.; Sir Alexander Siemens, Lieut.-Colonel Mark Mayhew, Dr. Boverton Redwood, D.Sc.; Messrs. Henry Norman, M.P.; Alfred F. Bird, Hugh Weguelin.

House Committee.—Messrs. James F. Ochs (Chairman), Frank H. Butler, G. C. Ashton Jonson, Hugh Weguelin, Robert E. Erskine, E. K. Purchase, J. Stewart Mallam.

Races Committee.—Major Lindsay Lloyd (Chairman), the Right Hon. Earl Russell, Capt. Bowman-Manifold, R.E., D.S.O., Messrs. E. H. Cozens-Hardy, Mervyn O'Gorman, Claude Johnson, Hugh Weguelin, R. E. Phillips, C. D. Rose, M.P., James Ochs, A. F. Bird, J. A. Holder, Lionel de Rothschild.

Industrial Committee.—Sir John Thornycroft (Chairman), the Earl of Shrewsbury and Talbot, Hon. C. S. Rolls, Messrs. W. H. Astell, C. Jarrott, J. D. Siddeley, Henry Sturmey, Ernest H. Hutton, E. Lisle, H. J. Swindley, Theodore G. Chambers, S. F. Edge, Frederick R. Simms, Herbert Austin, Captain H. P. Deasy.

Public Policy Committee.—The Hon. John Scott Montagu, M.P. (Chairman); the Right Hon. the Earl of Onslow, G.C.M.G.; the Right Hon. Earl Russell, Hon. Arthur Stanley, M.P.; the Right Hon. Sir J. H. A. Macdonald, K.C.B., &c.; Lord Stanley, M.P.; the Right Hon. Lord Suffield, K.C.B.; Sir Edgar Vincent, K.C.M.G., M.P.; Lieut.-Colonel H. C. L. Holden, R.A., F.R.S.; Sir David L. Salomons, Bart.; the Right Hon. Sir F. Jeune, G.C.B.; Messrs. William J. Bull, M.P.; Eric Chaplin; George Montagu, M.P.; C. E. Shaw, M.P.; Henry Norman, M.P.: A. F. Bird. Mr. J. W. Orde, Secretary.

Expert and Technical Committee.—Lieut.-Colonel H. C. L. Holden, R.A., F.R.S.; Professor C. V. Boys, F.R.S.; Major Lindsay Lloyd, R.E.; Lieut.-Colonel Mark Mayhew, Sir David Salomons, Bart.; Dr. Boverton Redwood, D.Sc.; Messrs. W. Worby Beaumont, Dugald Clerk, J. Lyons Sampson, Robert E. Phillips, Mervyn O'Gorman, E. H. Cozens-Hardy, C. Johnson, A. G. New, E. R. Calthrop.

Marine Motor Committee.—Dr. Boverton Redwood, D.Sc.; Capt. R. T. Dixon, R.E.; Major Lindsay Lloyd, R.E.; Sir John Thornycroft, F.R.S.; Lieut. Mansfield Smith-Cumming, R.N.; Messrs. E. Campbell Muir, G. Foster Pedley, Bernard Boverton Redwood, Henry Sturmey, A. F. Yarrow, G. Shenley, S. F. Edge, Roger H. Fuller.

Motor House Committee.—Messrs. J. S. Critchley, T. W. Staplee Firth, Edward Manville, Robert E. Phillips, E. K. Purchase, J. Lyons Sampson, J. D. Siddeley, and Col. Millard Hunsiker.

Next year is the 75th anniversary of the National Independence of Belgium, and in celebration of this event, M. Du Mot, the Burgomaster of Brussels, is seeking to employ automobiles very largely in carrying out a big programme which he is preparing for the event.

THE USE OF THE HIGHWAY.*

By A. MORESBY WHITE, Barrister-at-Law, F.R.G S., F.R.H.S., &c.

For all general purposes the Highway Act, 1835, regulates the use of most roads in this country, and some acquaintance with it is of great importance to every motorist. This Act prevails in all towns, including London, unless excluded by express enactment. There are various Metropolitan Acts which deal with the regulation of the streets of London ; in large centres like Liverpool and Manchester there are local or private Acts, and in many localities by-laws exist which affect the use of the street. All these being part of the law, a member of the British public is not allowed to plead ignorance of them.

Ways are of three kinds :—

(1) The carriage-way or cartway, commonly called a highway. Strictly speaking, *all* ways of any kind are highways.

(2) Horse-way, or bridle-path, or pack and prime-way, or drift-way.

(3) Footway or footpath.

Most carriage-ways are metalled, but there are still some carriage-ways, or highways, which run over the grass. For example, the roads on Salisbury Plain. Again, there may be an unfenced highway across a common, which is not a *via strata*, not having a metal surface. On such roads a traveller must keep to the beaten track, *via trita*, such as it is ; he may not wander off on to any part of the grass.

The difference between a main road and a by road, a county road and a district road, does not materially affect the right of the wayfarer. It is a difference which concerns the liability to repair and the manner of repairing the road.

All roads or ways are defined by the law to be a right of the public to passage over the soil of another. There is no easement because there is not what the law terms a dominant tenement or a serviant tenement. The right of way is merely a right to go from one place to another, and not to stop in the road. This seems to be the origin of all ways, and explains those numerous footpaths which exist in country districts from one farmhouse to another, often found existing long after the houses have disappeared.

Since footpaths and bridle roads do not admit motor cars or carriages, it is not necessary to deal with them at any length. The greater way—namely, the carriage way—always includes the less where there is no express evidence to the contrary. There may be a way where there is not a thoroughfare—for example, a *cul de sac*.

The right to use the carriage road extends to all kinds of vehicles, and a motor car or motor cycle is a carriage within the meaning of the Highway Acts, or of any other Act of Parliament.

The general right of the public in a highway is to pass and repass, not to loiter there. Technically speaking, a traveller has no right to stop in order to take a photograph of a pretty view. He may, indeed, stop to mend his machine when it breaks down or for purposes of rest or refreshment, but beyond this any act not strictly for the purposes of his journey may be a trespass. It is evident that nobody may break off anything from the hedges or trees by the roadside, nor may he take away anything which he finds on the highway with the intention of keeping it himself ; his duty in such a case is to endeavour to find the true owner and hand it over to him.

Two important statutory provisions are Secs. 72 and 78 of the Highway Act, 1835, and they are worth detailed consideration. A list of offences follows :—

(1) Riding on any footpath by the side of a road, or leading or driving any carriage on such footpath.

(2) Injuring the highway or the hedges or fences thereof.

The ownership of the hedge or fence is usually in the proprietor of the adjoining land.

(3) Wilfully obstructing the passage of any footway.

(4) Wilfully injuring the surface of the highway.

(5) Pulling down, destroying, obliterating, or defacing any milestone or direction post on any highway.

This would probably include any signboard erected in pursuance of the Motor Act, 1903.

(6) Playing at football or any other game on the highway to the annoyance of any passenger.

(7) Laying any timber, stone, hay, straw, manure, lime, soil, ashes, rubbish, or other matter or thing whatsoever on the highway to injure the highway, or to the injury, interruption, or personal danger of any person travelling thereon.

This is a very wide clause ; under it a stone used to scotch the wheel of a vehicle, and left in the roadway, amounts to an illegal act.

(8) Suffering any filth, dirt, lime, or other offensive matter whatsoever, to run or flow into or upon the highway from any lands or premises adjacent thereto.

(9) In any manner wilfully obstructing the free passage of the highway.

Under this provision successful proceedings have been taken against carters and others who leave their vehicles on the road in such a position that they impede the traffic on the highway. It is no defence for the defendant to prove that the plaintiff had plenty of room elsewhere in the roadway, and that the obstruction was as to part of the way only. The party obstructing is a trespasser, and he cannot justify his action by saying he caused no injury to any particular individual. There is one frequent cause of complaint, that of the tradesman's cart which is left outside premises for a considerable time, and if the street is narrow seriously affects the freedom of traffic. This, if unreasonably done, amounts to an offence. No doubt the right of access to premises adjacent to the highway is a necessary enjoyment of property. It is reasonable for your neighbour to give an evening party occasionally, and there may be a file of carriages running across your door, but it would be unreasonable if the file was not broken to allow your carriage to go up to your door, or any other vehicle which wanted to get to your house. It would be still more unreasonable if your neighbour were to turn his house into an assembly-room, and have a file of carriages there every day.

In rural districts a man frequently leaves his vehicle to go into a public-house to get a drink, but if he leaves it in such a position that the free passage of the road is obstructed, he can be convicted under this proviso.

We now pass on to Section 78 of the Highway Act, 1835, under which the following become offences :—

(1) If the driver of any carriage shall drive it on any highway without having someone on foot or on horseback to guide the same (carriages driven by reins being excepted).

This means the offence of riding or driving without reins. Strict application of this legal enactment to the autocar would produce some humorous, if unfortunate, results.

(2) The driver of any carriage who by negligence or wilful misbehaviour damages any person, horse, cattle, or goods conveyed in any carriage.

(3) Quitting a carriage and going on the other side of the hedge or fence enclosing the highway.

(4) Negligently or wilfully being at such a distance from the carriage, or in such a situation that the driver cannot govern or direct the horses drawing the same.

Under these provisions it is possible to procure many convictions for offences which are at present winked at. The object of them is to prevent danger to the public from horses being left unattended on the highway They include a carriage *standing* by the roadside as well as one actually in motion. It will be observed that the question is entirely independent of obstruction to the way, and therefore that the merely leaving a motor car in the way, and going on the other side of the hedge to shoot or picnic, or for any other purpose, is an offence under the Highway Act.

(5) Leaving a cart or carriage on the way so as to obstruct the passage thereof.

This may be compared with the preceding Clause 9 of Section 72 as to obstructing the highway.

(6) The driver of any wagon, cart, or carriage, or of any horses or other beast of burden on *meeting* anything in the road must keep on the *near* side of the road. This does not include meeting a foot passenger. There is a separate rule with regard to overtaking, which usually is to overtake and pass on the off side. In districts where the Towns Police Clauses Act, 1847, applies—that is to say, in all urban districts—the person in charge of a vehicle must, when overtaking other vehicles, pass on the off side. As to motor cars, the same rule is laid down by the regulations of the Local Government Board in Article IV. of the Regulations in 1896.

(7) If any person wilfully prevents any other person passing him on the highway.

(8) Any person who by negligence or misbehaviour hinders or interrupts the free passage of anyone or any cart or carriage on the highway; and who shall not keep his wagon, cart, or other vehicle to the left or near side of the road for the purpose of allowing such passage.

This clause, if properly enforced, would work wonders in freeing the traffic. A few convictions under it might teach drivers of heavy slow-moving vehicles their obligations to the travelling public.

(9) Riding or driving any horse or carriage furiously and so as to endanger the life or limb of any passenger.

This is a most important clause. The danger must be to a human being and not to an animal, but the passenger need not be a foot-passenger ; it includes any person passing upon the highway. Road racing is clearly an offence under this clause. Indeed, a conviction has been upheld where there was no evidence that any passenger was on the highway at the time when the carriage was furiously driven along it.

(*To be continued*).

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* A paper read at the Automobile Club on March 17th.

CLUB DOINGS.

Preston Automobile Club.—An Automobile Club for Preston and district was formed at a well-attended meeting of motorists, held at the Shelley Arms Hotel, Preston, on Thursday, the 17th inst. Mr. J. Todd was elected president, Mr. C. Wilding, hon. secretary, and Mr. Humphreys hon. treasurer, and a council was appointed consisting of Dr. Tindall, Dr. A. E. Rayner, Dr. Sellers, and Messrs. C. Parker, R. McNab, Iddon, and Breakell-Moss. The subscription was fixed at half a guinea, which will allow of affiliation with the Automobile Club of Great Britain and Ireland, and the Motor Union. The hon. secretary, *pro. tem.* (Dr. Rayner), announced that as the outcome of a protest by the Preston motorists against the ten mile limit, the local Town Council and nearly all the district authorities had withdrawn their applications for the adoption of that limit.

Scottish Automobile Club (Western Section).—The third annual general meeting of this section was held in Glasgow on Monday last, Mr John Adam presiding. The report showed the section to be in a healthy condition, both numerically and financially. Starting the year with a membership of 114 the additions numbered 100, but as nine dropped out from various causes the net increase was 91, leaving the total at 205 at the end of the year, and as eight have joined since the membership is now 213. The financial statement showed a balance at 31st January of £95 19*s*. 6*d*. to the credit of the section.

After recounting the various runs during last summer, and the meetings and discussions during the winter, all duly chronicled in these columns as they occurred, the report claims credit for some work by members of the section during the Gordon-Bennett race in Ireland, for co-operation with the Motor Union in the preparation of a handbook of hotels, &c. ; for enquiring into the question of fixing a standard of density for petrol and of opening up further sources of supply. Valuable vigilance work had been performed in Glasgow when restrictions were proposed on motor vehicles in the public parks and about the harbour and docks, representations to the Town Council and Clyde Trustees resulting in very great modifications of the original proposals.

The election of office-bearers resulted as follows :—Honorary president, the Honourable the Lord Provost of Glasgow, Sir John Ure Primrose, Bart. ; members of committee, Messrs. John Adam, H. W. Brock, Nicol P. Brown, J. B. Talbot Crosbie, W. H. Kingsbury, D. McColl, T. Blackwood Murray, Henry M. Napier, James R. Nisbet, H. Prosser, John M. Ross, J. B. Shanks, Robert J. Smith, Thomas Symington, and William Weir.

Representatives on the General Council, Messrs. Burns, Kingsbury and Napier.

Yorkshire Automobile Club.—Under the chairmanship of Mr. King, of Harrogate, the general meeting of this club was held on the 17th instant at the Leeds headquarters. New draft rules were adopted, and runs for April announced as follows :—April 9th, 16th, 23rd, and 30th to Aberford, Ilkley, Doncaster, and Borough Bridge respectively.

The Motor Union.—The general meeting of the Union was held at the Agricultural Hall on Tuesday afternoon last, when Lieut.-Col. Holden, the newly-elected chairman of the A.C.G.B.I., occupied the chair. A large gathering of members was present, and considerable interest taken in the proceedings. The report, subject to some slight alterations, was adopted, and the accounts for 1902 and 1903 passed unanimously. The rules under which the Motor Union for the future is to work were deferred for further consideration by a special committee, and these will be subsequently brought up for confirmation at a general meeting of the members.

The chairman announced that thirty clubs and a large number of individual members were represented at the meeting, which gave an idea of the enormous importance of the Association. The present membership was 5,136, and he thought it was the largest body of organised automobilists in the world. The membership recently had progressed by leaps and bounds, and altogether the prospects of the Union were extremely bright. The objects of the Union, which was thoroughly cosmopolitan, was to draw together all automobilists of every class and description for mutual protection. Not only men owning large cars, but all owners of small cars and motor cycles were cordially welcomed. The chairman then dealt with a few details of the report, specially drawing attention to the number of legal cases which had been successfully dealt with by the Union during the past year. He thought the action taken by the Motor Union had induced a much more generous view by the authorities and all classes of the public towards automobilists generally.

A short discussion arose in regard to the position of the Union in view of no formal rules ever having so far been adopted, and the matter was dropped upon the Chairman announcing that the whole question of the rules would be shortly submitted to the general members for consideration, when all questions affecting the position and the working of the Union would be carefully provided for. In addition, a finance committee would be appointed to deal with the whole of the accounts.

A vote of thanks to Mr. Helmore, the hon. auditor of the Union, for his services to the Association from its inception without any remuneration whatever, was passed, Mr. Helmore being unanimously re-appointed auditor for the ensuing year.

A vote of thanks, carried with acclamation, was accorded to the chairman, and a like expression of feeling in favour of Mr. Roger Wallace, K.C., for his past services to the Union, concluded the business of the meeting.

For Whitsuntide the Motor Cycling Club intend organising a run from London to Edinburgh, the journey to be completed within twenty-four hours, starting from the General Post Office at 10 p.m. on Friday, May 20th. Medals and badges will be awarded to the successful competitors.

Motor Volunteer Corps.—The undernamed gentlemen have been enrolled :—J. McKelvie, W. H. George, G. F. Herron, G. N. Hall.

The Army Council has approved of the corps being armed with rifles. The undernamed members were engaged on a tour of inspection under the General Officer Commanding Eastern District, visiting Brentwood, Bently, Kelvedon, Hatch, and Ongar, &c. : E. E. Bentall, W. Bloomfield, C. Knight, and E. Sinclair.

On the 8th instant, Mr. J. P. Dean drove from Warminster to Southampton, and from thence drove the Quarter-Master General, Southern District, to Lyndhurst, Romsey, and Botley, in connection with a staff ride. Mr. Harvey Dixon drove from Emsworth to Southampton, and thence drove the General Officer Commanding Southern District to Beaulieu, Brockenhurst, Lyndhurst, and back to Southampton, on a staff ride on the 9th instant.

Captain and Adjutant G. Skeffington Smyth, rejoined from leave of absence on the 17th instant and resumed his duties.

We are officially informed by the President of the Cycle Manufacturers' Association and the Secretary of the Stanley Show that arrangements have been made between them by which the National Cycle Show at the Crystal Palace will be discontinued. Those who have followed the position of the two shows of late years will hardly be surprised at this conclusion, which unquestionably is a wise one. There might have been a possibility, and we think one that would have proved very successful, of making the Crystal Palace Show one dealing exclusively with mechanically-propelled bicycles and tricycles. We venture to think that a magnificent exhibition of this type of machine could have been got together. Possibly this idea may be revived in some form shortly, especially in view of the decision taken by the Society of Motor Manufacturers and Traders to henceforth exclude motor bicycles from their Show.

Mr. D. G. Leechman having resigned the position of secretary of the Cycle Engineers' Institute through pressure of professional work, we understand that the Institute are now seeking a new secretary. The position carries with it a salary and the use of a room in Exchange Chambers, New Street, Birmingham. The secretary is not required to give his exclusive services to the work of the Institute, and therefore the position should be invaluable to an energetic business man, as he must necessarily come into touch with the leading men in the trade. Applications, with full particulars of qualifications, should be made in writing to the president of the Institute, Mr. A. S. Hill, Dale Street, Coventry.

1904 RATING OF FRENCH MOTOR BOATS.

Motor boat events this year bid fair to more than maintain the remarkable interest which of recent years has been manifested in all parts of the world. The 1904 season will open with the Monaco Races next month, when a splendid list of entries has been made of most of the best-known European power boats. That the authorities are determined to do everything in their power to render the regulations controlling such competitions at once fair and conducive to thoroughly reliable results is clearly evinced by the revision of the rules which took place at the last Congrès des Sociétés Nautiques. The Congrès was held during the early part of last December under the combined auspices of the Y.C.F. and the A.C.F., and passed rules controlling all motor boat racing in French waters during the year 1904. As it is quite possible that these rules may tend to affect the racing in home waters, and apart from the interest Englishmen have in the foreign competitions, we publish herewith a detailed *résumé*.

Boats are, as hitherto, classified as "racers" or "cruisers," and no boat may compete under both classes. Distinctions regarding method of propulsion are made as follows:—(*a*) Explosion motors of any kind; (*b*) Electric motors; (*c*) Ordinary steam engines; (*d*) Steam engines using flash-type generators irrespective of kind of fuel used.

For the "racers" there are five classes by length, which, as before, will be measured on the horizontal between the extreme verticals of the hull (excluding the rudder, unless it forms part of the propelling mechanism). The five classes by length are as follows:—(1st) Not exceeding 6·50 m.; (2nd) Not exceeding 8 m.; (3rd) Not exceeding 12 m.; (4th) Not exceeding 18 m.; (5th) Not exceeding 25 m.

In the "cruiser" category there are four main limiting dimensions, viz:—Length, horse-power, midship beam, and height of freeboard.

The classes by length are the same as for racers, while the limitations with regard to horse-power are as follows:—(1st) Not exceeding 17-h.p.; (2nd) Not exceeding 26-h.p.; (3rd) Not exceeding 53-h.p.; (4th) Not exceeding 103-h.p.; (5th) No limit to power; thus each class by length has its corresponding limiting horse-power. In the calculation of horse-power the following formulæ must be used:—

Explosion motors (petrol, alcohol, &c.)—

$$\text{h.p.} = \frac{\text{Total cyl. capy. (Cm}^3\text{)}}{140}$$

Explosion motors (heavy oil)—

$$\text{h.p.} = \frac{\text{Total cyl. capy. (Cm}^3\text{)}}{250}$$

For steam engines using flash generators—

$$\text{h.p.} = \frac{\text{Total cyl. capy. (Cm}^3\text{)}}{175}$$

Ordinary steam engines and electric motors to be calculated by the usual formulæ. Certain specifications respecting the heavy oil which may be used are given. Its specific gravity must exceed 0·8 at 15° Cent., the minimum flash point 36° Cent., and the freezing point 12° Cent.

The limitations respecting the midship beam and freeboard for each class are to be ascertained from the following formulæ:—

Midship beam may be equal to or greater than $0·6 + \frac{\text{Length}}{8}$ (metres).

Height of freeboard may be equal to or greater than 0·25 + 0·03 length (metres).

Both the dimensions are subject to 2½ per cent. allowance.

The freeboard measurement will be taken to the lowest point when under load and with the usual rig. Accessories not part of the hull proper will not be reckoned in this measurement. The loading must be equal in kilogs. to sixty times the real length, and either ballast or passengers (at 70 kilogs. each) may be used. For the convenience of our readers we publish herewith in tabulated form a *résumé* of the cruiser class limitations, some of the more important of which have been calculated for each class.

Cruisers Only.

Class.	Length (max.), metres.	H.P. (max.).	Total cylinder capacity (max.).		Midship beam (min.), metres.	Free-board (min.), metres.	Load (min.), kilogs.
			Petrol, &c. cm³.	Heavy oil. cm³.			
1	6·50 (21′ 6″)	17	2,400	4,250	1·41	0·44	390
2	8·0 (26′ 6″)	27	3,650	6,500	1·60	0·49	480
3	12·0 (39′ 6″)	53	7,400	13,250	2·10	0·61	720
4	18·0 (59′ 6″)	107	14,500	25,800	2·85	0·79	1,080
5	25·0 (82′ 6″)	no limit	no limit	no limit	3·72	1·00	1,500

Starts in all races will be either "flying" or in rotation; starting from moorings is entirely abandoned.

Class colours have been assigned as follows:—Class I, red; Class II, blue; Class III, black; Class IV, light green; Class V, orange. Both racers and cruisers must adopt the above colours with this distinction: racers to have their numbers painted in the class colour on a white ground, while cruisers have their numbers painted in white on a ground of their class colour.

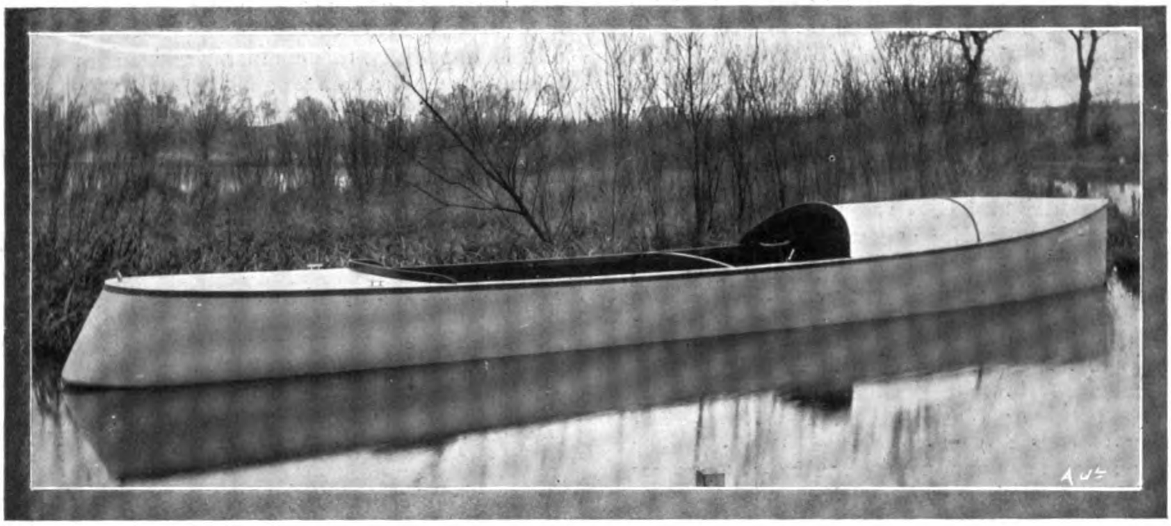
The Hélice Club have now drawn up a detailed classification table for motor boats, which is based upon the general rules given above. Apparently, in order to obviate the necessity for making linear measurements of the cylinders, a scheme whereby actual fuel consumption is to be taken as a basis of power instead of cylinder capacity, has been adopted. The competing boats will be required to make a trial run at full speed with a club official on board. Running under these conditions the fuel consumption, as measured in kilogrammes per hour, must not exceed the amount allotted to its class as indicated in the table below:—

Type of cruiser.	Classes, with maximum length in metres for each.				
	I 6·5	II 8·0	III 12·0	IV 18·0	V 25·0
	Kilogrammes per hour.				
Petrol of 0·68, 0·70, 0·72 specific gravity and under	2·80	4·20	5·60	8·40	17·50
Heavy oil of 0·80 specific gravity and over	3·08	4·62	6·16	9·24	19·25
Alcohol, pure	4·84	7·26	9·68	14·52	30·25
Alcohol mixture, 25 per cent.	4·28	6·42	8·56	12·84	26·75
Alcohol mixture, 50 per cent.	3·72	5·58	7·44	11·16	23·25
Steam, coke-fired boiler ...	16·00	22·80	28·80	36·00	62·60
Steam, flash generator, oil or solid fuel	12·80	19·20	25·60	38·40	80·00
	Watts per kilometre.				
Electricity	7·065	10·156	12·696	19·430	40·480

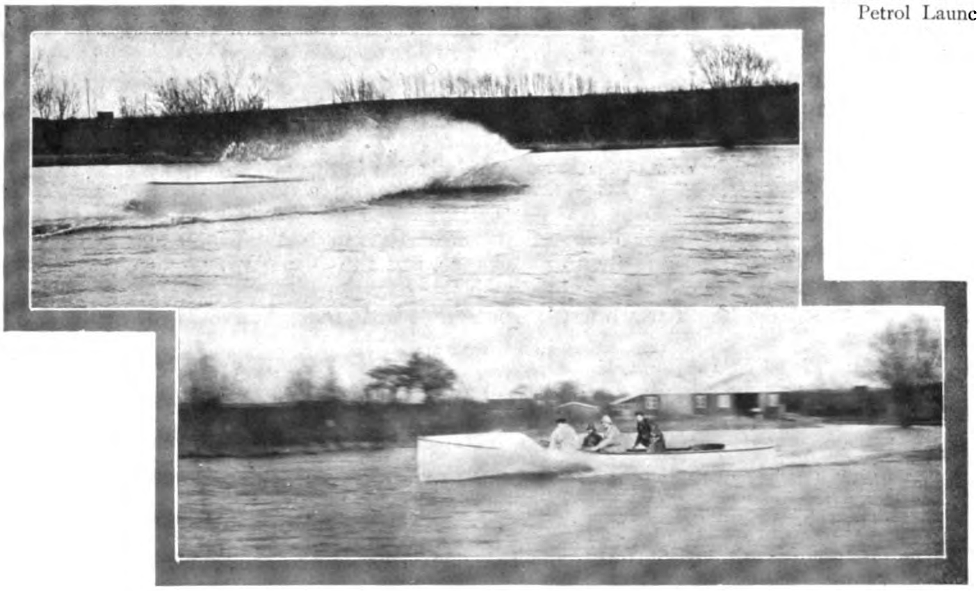
Class **VI**, above 25 metres, without any limit of power.

In the above table it will be noticed that there are six classes, the sixth being an extra one to include large boats over 25 m. in length. An examination of the table on a basis of 2½-h.p. per kilog. of petrol per hour shows that the power limit for each class has apparently been considerably reduced compared with that authorised by the Congrès. The horse-power for each class thus approximated being 7, 10½, 14, 21, 44-h.p. for Classes I. to V. respectively. In the case of Class I. this may be explained by the fact that the Congrès ruled that for boats not exceeding 6·50 m. in length a subdivision might be made to accommodate those of less than 6-h.p. We reproduce the figures relating to the Hélice Club from our contemporary *L'Auto*, and must submit these to our readers on their merits. In the case of the electric boats we would suggest that "watts per kilom." should read "kilowatts per hour," which would bring the figures given for this class into line with those using petrol, allowing 75 per cent. efficiency in the smaller and 80 per cent. efficiency in the larger motors.

THE PETROL LAUNCH "NAPIER MINOR."



View of the "Napier Minor" Petrol Launch at Anchor.



The "Napier Minor" Travelling at Full Speed and at Half Speed.

THE first of the smaller 1904 type Napier racing launches was successfully launched at Goring-on-Thames from Saunders' boat-yard a few weeks ago, and, after having proved itself to be a very satisfactory boat during its trials, was last week sent to Monaco to take part in the various races which are to be held there early next month.

A very good idea of the appearance of this craft is conveyed by the illustrations which we give showing her at rest, travelling at half-speed and travelling at full speed respectively, whilst the arrangement of the propelling mechanism is well shown, and the boat in one picture is seen being loaded preparatory to shipment to France.

The hull is constructed, on the Saunders'

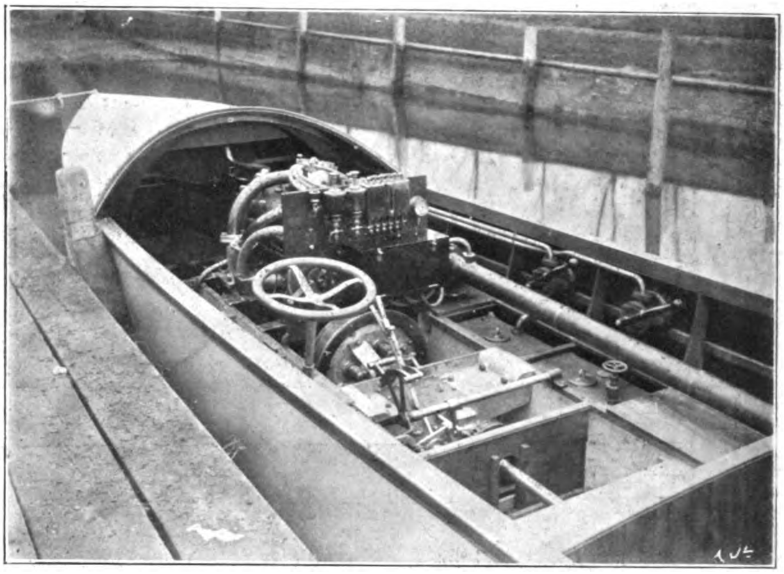
The "Napier Minor" off to Monaco.

"Sewn" system, of cedar and mahogany with oak beams; it is 35 ft. long, has a beam of 5 ft., and has ample freeboard, as seen in the illustrations. Ample accommodation, too, is provided for the passengers in the afterpart, where the cockpit has a hood to afford protection from rain or spray.

The forward portion of the boat, which contains the machinery, is completely divided off, and here is fixed the four-cylinder 53-m.p. Napier engine, and the reversing gear. The controlling levers and pedals are arranged in practically the same manner as on a car, so that the engine, reversing gear, and the rudder can be operated by one man. A kind of dashboard is fixed between him and the engine, and to it are attached the lubricators, the manometer, and the ignition apparatus. The whole of the machinery—and the operator—are protected by a whaleback. The main-clutch and the reversing-gear are also under his immediate control, and the steering wheel is fixed beside him on the port side of the boat, mounted on a vertical pillar. The exhaust-pipe is water-cooled, and we are told that there is a total absence of noise and visible vapour where the gases emerge at the stern.

The boat has seating accommodation for about fifteen passengers, and there is, we understand, practically no vibration. By regulating the throttle-valve, the speed can be reduced to about three or four knots per hour, although the launch is capable of attaining an extremely high rate of speed.

It is hoped that this comparatively small racing craft will give a good account of itself even against the more powerful foreign boats which she is likely to meet in France, but the big Napier racer, which is to compete with these large racers later during the year, is not expected to be launched until May.



View of the Propelling Mechanism in the "Napier Minor," showing the Instrument Board, the Clutch, the Steering Wheel, and the Controlling Levers.

RACES, RECORDS, AND TRIALS.

CANNES AUTOMOBILE WEEK.

Although the Nice motor week is generally regarded as the real opening of the automobile season, a meeting which was welcomed as an important prelude this year to the above splendid fixture was the series of events organised by the A.C. of Cannes. The opening item on the programme for the 13th inst. was a gymkhana on the Albert Edward Jetty, which attracted quite a number of splendidly dressed and fashionable people, including a number of Royalties. The next day a jaunt for tourist cars over 100 kiloms. brought together a good list of entries. During this run, the route for which was only announced to the competitors at the moment of starting, speed trials and hill tests were arranged, those successfully coming through being awarded certificates. Amongst these were:—MM. Gallicé (12-h.p. Clément), A. Burton (60-h.p. Mercedes), Ch. Loubet (10-h.p. Peugeot), Rouff (20-h.p. Rochet-Schneider), D Durand (22-h.p. Mors), &c.

The following day, the 15th, was devoted to a speed trial over a kilometre on the flat, and a 500 metre hill speed event, both from a standing start. The former took place on the Frejus-Cannes road near Mandelieu, and the latter about the centre of the Esterel road, near the Adrets Inn. Burton Alexander secured first place in both events with his 100-h.p. Gobron-Brillié car, steering his racer in admirable style, giving promise of some good work when he drives in the Gobron-Brillié team in the French Eliminating Trials for the Gordon-Bennett Race. De Cesti scored second honours on a 60-h.p. Mercedes, Durand third with a 40 h.p. Mors, and Serraillier fourth on a 20-h.p. Rochet-Schneider. The chief performances were:—

	kiloms. m. s.	500 metres. s.
1. Burton Alexander (100-h.p. Gobron-Brillié)	$46\frac{3}{5}$	$33\frac{2}{5}$
2. De Cesti (60-h.p. Mercedes)	$48\frac{1}{5}$	36
3. Durand (40-h.p. Mors)	$56\frac{4}{5}$	$41\frac{4}{5}$
4. Serraillier (20-h.p. Rochet-Schneider) ...	1 $7\frac{2}{5}$	$56\frac{3}{5}$

Inghibert, on a Peugeot motor bicycle, covered the 500 metres in $38\frac{3}{5}$ secs.

On the 16th, a consumption trial was run off. Each competitor was supplied with one litre of petrol, and then proceeded to travel as long a distance as possible on this, the Square on the Croisette Promenade, which gives a run of 360 metres for each turn, being selected for the trial. The results were as follows:—

Motor Bicycles.

	kiloms.	Average speed. k. p. h.
1. Zimmy (Clément)	29·232	21·50
2. Inghibert (Peugeot)	18·320	27·50

Cars 400 to 650 kilogs.

	kiloms.	Average speed. k. p. h.
1. Mounier (Renault)...	14·777	24·50
2. Gueyraud (Renault)	11·322	19·80
3. Russel (Darracq)	10·950	19·15

Cars 650 to 1,000 kilogs.

	kiloms.	Average speed. k. p. h.
1. Loubet (Peugeot)	11·148	30·0
2. Gallice (Clément)	9·770	23·60
3. Heurtard (Panhard-Levassor)	9·497	25·80
4. Durand (Mors)	8·492	30·80
5. Quinson (Gladiator)	8·253	30·80
6. Spinabelli (Georges-Richard)	6·607	25·60

Cars over 1,000 kilogs.

	kiloms.	Average speed. k. p. h.
1. Serraillier (Rochet-Schneider	6·320	28·60
2. Rouff (Rochet-Schneider)...	4·241	23·10
3. Tirribillot (Rochet-Schneider)	3·610	24·75

The second portion of the tourist run for obtaining certificates took place on the 17th, when the same competitors as on the first day successfully took part. The following day, March 18th, a delightful

1 2 3 Top row.
4 5 6 7 8 Middle row.
9 10 11 12 Front row.

CANNES AUTOMOBILE WEEK.—A group of honorary officials and automobile enthusiasts taking part in the fêtes and events.

1.—M. Guirison. 2.—M. Heurtard. 3.—M. Nouris.
4.—M. Spinabelli. 5.—M. Bret (Timekeeper A.C.C.). 6.—M. Huet (Timekeeper A.C.F.). 7.—M. Audran. 8.—M. Fontaux.
9.—Mdme. Salange. 10.—M. Alexander Burton. 11.—M. Gallice (Pres. A.C.C.). 12.—De Cesti.

event, in the form of a paper chase, was the attraction, in which M. Durand, on his Mors car, secured first place in 3 hrs. 21 mins., only 10 minutes separating the winner and Spinabelli, on a Georges-Richard, the last man in. The week's amusements were brought to a close on Sunday last with an appearance competition.

Hardly breathing time was given after the Cannes week before the start of the Nice automobile week, which opened on Tuesday and Wednesday of this week with a tourist trial, the programme for the rest of the week including a gymkhana on Thursday and a paper chase on Friday. To-morrow (Sunday), a Corso Fleuri will be held in the Jardin Public, on Monday (28th) the mile speed trials at the Var Hippodrome, which will be followed immediately by the competitions for the two cups offered by Baron H. de Rothschild, and tries to break the kilom. records. March 29th, *Concours d'elegance* at Monte Carlo. March 30th, the Coupe de Caters hill speed competitions (subject to official authorisation), and on April 2nd the Salon will be opened.

CANNES AUTOMOBILE WEEK.—The Hill Climb for Tourist Cars. A group of officials and interested onlookers at the top of the hill waiting for the competitors.

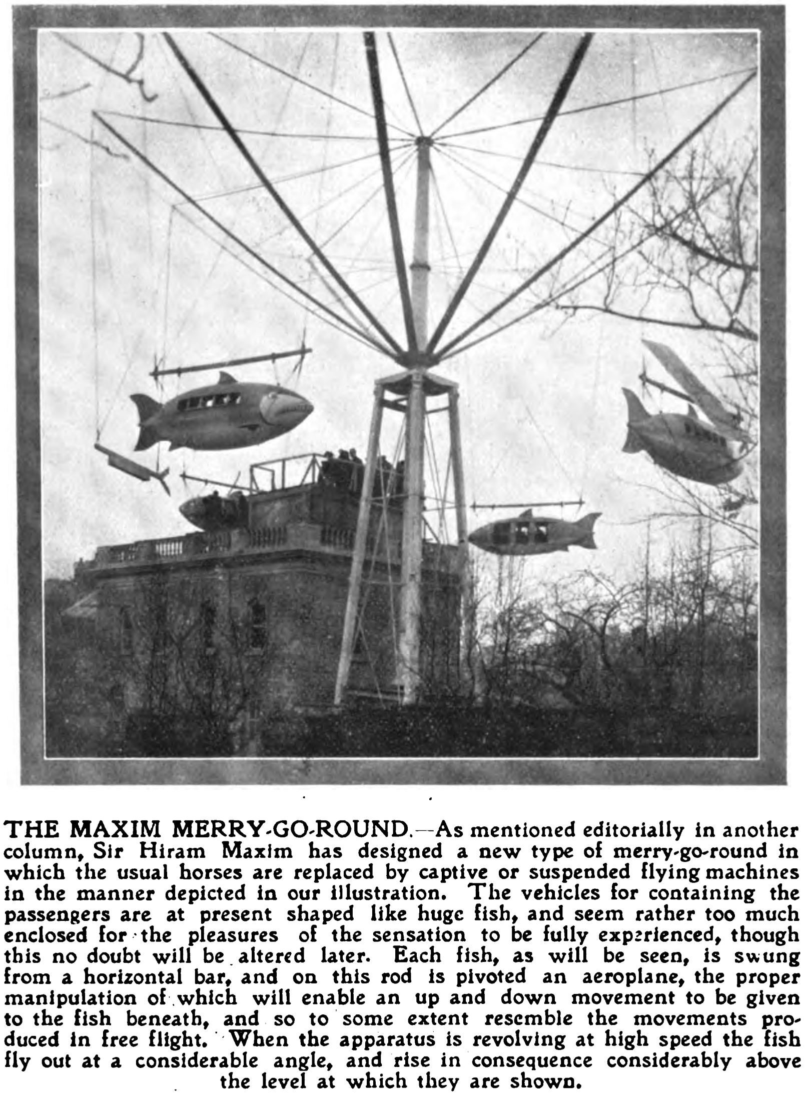
IN the tourist run on Tuesday 31 cars were entered, of which 21 started, and 19 returned in good time to Nice. The remaining two competitors parted company *en route*, as they only joined to "swell the ranks."

AFTER two postponements, the Monaco Motor Boat Exhibition is officially announced to open on Wednesday next, the 30th inst.

AN International Cup is to be offered by the Motocycle Club of France for motor bicycles under 50 kilogs., based upon the same lines as the Gordon-Bennett Cup for cars. The cup will be of the value of 2,000 francs, and will be run for this year for the first time in France in July.

A RELIABILITY Trial, over a distance of 1,000 kiloms., for motobicycles is being organised in Italy, starting from Brescia. Maximum speed allowed will be 35 kiloms. per hour, and maximum horse-power 3½.

We referred last week briefly to the Side-Slip Trials of the Automobile Club, which will start on April 18th. The 1,000 Miles Endurance Test with which this competition will start will occupy about 5 or 6 days, and in addition to the side-slip and brake tests which will take place at the new Clement-Talbot works, special note will be taken of the power absorbed by each device, by running the car down hill by gravity both with and without the device fitted, and measuring the distance between the stopping places in each case. In determining the final awards, points which will be taken into consideration will be the ease of attachment, renewal, and price. A device which gives the best control of the car under all possible conditions, that is to say, whether for side-skidding of front or back wheels, or for forward slipping, will be considered the best. 18 cars will actually take part out of the 21 original entries, 3 having been ruled out of the competition owing to various reasons.



THE MAXIM MERRY-GO-ROUND.—As mentioned editorially in another column, Sir Hiram Maxim has designed a new type of merry-go-round in which the usual horses are replaced by captive or suspended flying machines in the manner depicted in our illustration. The vehicles for containing the passengers are at present shaped like huge fish, and seem rather too much enclosed for the pleasures of the sensation to be fully experienced, though this no doubt will be altered later. Each fish, as will be seen, is swung from a horizontal bar, and on this rod is pivoted an aeroplane, the proper manipulation of which will enable an up and down movement to be given to the fish beneath, and so to some extent resemble the movements produced in free flight. When the apparatus is revolving at high speed the fish fly out at a considerable angle, and rise in consequence considerably above the level at which they are shown.

Mr. George A. Kessler, of New York, is reported by the *New York Herald* to have covered the distance between Biarritz and Madrid with a 60-h.p. Mercedes car in 11 hrs. 10 mins., thus beating all previous records. This time is faster by 4 hrs. 56 mins. than the schedule time of the Sud Express train.

The Ormond-Daytona Beach in Florida is an appreciable journey from New York, and when it was suggested that an equally good course could be found at Virginia Beach for the holding of speed contests, and possibly part of the American Eliminating Trials for the Gordon-Bennett Race, it was hailed with delight by the A.C. of America. A special committee appointed to inspect the suggested course and report, has, however, decided against the Virginia course, it being stated that it in no way comes up to the magnificent stretch of hard sand on which recently the sensational speed records have been made by Mr. Vanderbilt and others.

A novel competition took place on Sunday last under the auspices of the Antwerp Automobile Club. Seventeen competitors had each a parcel entrusted to them at the starting point to deliver at certain houses in various outlying towns and villages. This parcel had to be delivered and another one received in exchange, which again had to be delivered at a second house in another village, and the return journey then completed to Antwerp, the first car home being the winner. For each car a route of exactly the same number of kilometres was selected, and naturally the element of luck and a clear knowledge of locality was an essential feature in helping to win. The first cars in were:—Joostens on a Clement in 1 hr. 30 min., L. Elskamp on a Gobron-Brillie, Burbure on a Pipe car, and De Ridder on a Gladiator, each following Joostens and each other at 1 min. interals. The longest time taken was 2 hrs. 16 mins.

The Ostend Automobile Week has been advanced by a few days, and will be held from July 15th to 21st, opening with a two days' tourist run. Kilometre and mile speed races will take place on the 17th, and the completion of the tourist trial will be made on the 19th and 20th, a 50-kilometre speed event taking place on the 18th from Ostend to Blankenberg. The usual battle of flowers and appearance competitions will conclude the week. Immediately following, on the 23rd, the Spa Automobile Week will commence, and the events will include long distance runs, hill climbs, speed tests, &c. The Municipal Council of Spa have voted a sum of 12,500 francs towards the expenses of the fêtes.

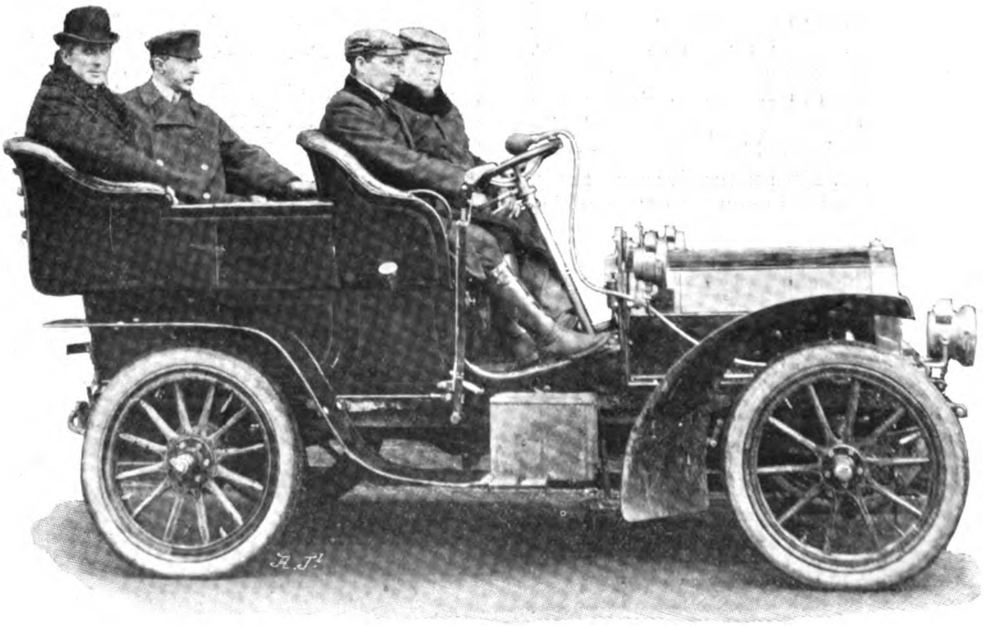
An Endurance Contest between Nice and Milan, organised by the Nice Motor Club, is to take place on June 9th, when there will be classes for every type of motor vehicle.

Fees paid by metropolitan automobilists are mounting up steadily. The sum received so far by the London County Council is over £5,258, and the applications are coming in at the rate of about thirty-five a day.

The imports of motor cars and parts for February again show an increase, both in numbers and value, over January. The total for the month is £206,995, representing 538 cars, whilst motor cycles and parts represent a total of £4,954, bringing the total importation for both these classes for January and February up to £336,467. The exports of British-made motor cars and motor cycles have *per contra* decreased, the total for February being £31,576 against £32,257 for January. The re-exportation of foreign and colonial cars from Great Britain has more than doubled in value, £18,854 being the total for February against £9,223 for January.

Madame Du Gast, the fearless French chauffeuse who has driven so splendidly in different Continental speed events. It is Madame Du Gast who has so strongly protested against the decision of the A.C. de France prohibiting ladies taking part in either the Gordon-Bennett French Eliminating races or the Race itself.

The use of the automobile in Royal and Court circles is rapidly increasing. Prince and Princess Alexander of Teck returned last week from their honeymoon to Claremont at Esher, where they are at present staying with the Duchess of Albany, by motor car, being cordially greeted along the road wherever they were recognised. On the following day the King and Queen ran down by motor car from Buckingham Palace to visit them, the King using his new powerful Mercedes, while the Queen followed in a separate car of her own. The King, of course, has no need to conform to the law of numbers, and his Mercedes was only distinguished by the Royal Arms, but the car on which Her Majesty Queen Alexandra drove, being duly registered, carried a regulation number plate. It is understood Her Majesty is ordering a new automobile, and that the one on which she drove to Esher is only being used pending its arrival.



Our photograph shows one of the latest 16-20-h.p. 4-cylinder Cudell Cars, which are now to be introduced extensively into this country by Krupkar, Limited, who we understand have taken over the entire rights for Great Britain. This type of vehicle has been known favourably for some two years, and in the hands of Mr. G. W. Morrison, Managing Director of Krupkar, Limited, no doubt the chance of further testing the merits of the Cudell Car will be afforded to those interested.

IF possible at Florence, on one of the chief promenades, kilometre speed trials will take place in connection with the tourist run from Paris to Nice and Rome, which has been organised by *La France Automobile* for next month.

NOT unnaturally, when a Receiver is appointed to a company, most people assume that the company is consequently undergoing a process of being "buried." The recent appointment of an Official Receiver of the Lanchester Engine Company, Limited, has, no doubt, therefore created this impression amongst automobilists. We understand, however, officially that not the smallest break is taking place in the carrying on of the business, and that orders for cars can be placed as usual, and will receive immediate attention from the management. The present Receivership, it is anticipated, is entirely of a temporary nature, pending a scheme of reconstruction which is now under consideration.

SERIOUS endeavours are now being made in Paris to obtain from the Prefect of the Seine special regulations whereby public service automobiles may be permitted to charge a special scale of fares, instead of having to work under the same tariff as the ordinary horse-drawn cabs. There appears to be every official inclination to meet the request. It should, under these conditions, be possible to work these vehicles successfully, and the experience which would be gained in a few years would no doubt lead to necessary improvements, which ultimately would enable the special tariff to be superseded, and the mechanical vehicle to be again placed on the same footing as its horse-drawn competitor.

MOTOR car cases in the police courts will in future be likely to prove even more attractive than they have in the past, if the method of arranging a public timing competition by two intelligent constables which Mr. Firth inaugurated last week is to come into general use. A motorist had been summoned on the usual charge, and two constables who timed him along the Kensington Road agreed in their timing to the thousandth part of a second, more or less. Their unanimity, as is usual with police constables when giving evidence before magistrates, was marvellous. Mr. Firth naturally suspected it, and a competition was arranged in court, the two police constables, armed with their stop-watches, taking up convenient positions, and starting at the signal given by another constable across the court. In about 20 seconds Mr. Firth stopped them, and it was discovered that on this occasion their unanimity was less amazing, for their watches differed by a whole second. Mr. Lane thought this good enough, but as even this means an error of at least 5 per cent. on the 20-mile question, it may make all the difference.

TO meet the demand which exists for a variable-speed-gear for motor bicycles, Mr. Henry Sturmey, whose three-speed gear for ordinary bicycles is already well known, has we learn just patented a similar device for attachment to the crank-shafts of bicycle motors. The gear is designed either for two or for three speeds, and can be used in conjunction with a driving chain or with a belt. We understand that he is too busy to place this new gear on the market himself, but wishes to make arrangements with motor bicycle builders for its adoption.

THE Forman Motor Company, Limited, notify us that, owing to the increase of their business, they have moved to more centrally situated premises in High Street, Coventry.

LAW REPORTS.

Napier *versus* **Jarrott.**—This case was commenced before Mr. Justice Kekewich on Tuesday last. The action is one brought by the plaintiff, Mr. M. S. Napier, against the defendant, Mr. Charles Jarrott, in which the main claim is for a declaration that the defendant Jarrott is bound at all times to exercise his voting power under the shares standing in the name of the defendant in such manner as the plaintiff may from time to time direct. The plaintiff claims an injunction restraining defendant from exercising his voting power contrary to the plaintiff's wishes, and a declaration that all shares in Charles Jarrott and Letts, Limited, allotted to or held by or for the defendant, and constituting or being part of 9,993 shares referred to in the statement of claim, be charged with a liability to contribute one moiety of the capital monies repayable to the plaintiff on the dissolution or determination of the partnership firm of Charles Jarrott. The case was adjourned, and not concluded at the time of going to press.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Cocks (Limited).—Capital, £12,000 in £1 shares. Object, to acquire the business of manufacturers, &c., of motor-cars and accessories now carried on by H. L. Cocks, at 77 and 78, High Street, Marylebone, W., as La Société des Automobiles Françaises. First directors, H. L. Cocks and T. E. Metcalfe.

Clipper Tyre Company (Limited).—Capital, £65,100 in £1 shares. Chief objects, to adopt an agreement between the Clipper Pneumatic Tyre Company (Limited), of the one part, and W. S. Tinkler (as trustee for this Company), of the other part, and to carry on the business of manufacturers of tyres and wheels for cycles, carriages, and vehicles of all kinds, &c.

Imperial Motor Company (Limited).—Capital, £10,000 in £1 shares. Object, to adopt agreements with A. Giovanelli, J. S. Stuart-Wallace, and A. Carlisle-Herts, and to carry on the business of manufacturers of and dealers in motor or other cars, &c.

International Westrumite (Limited), Dacre House, Victoria Street, S.W.—Capital, £320,000 in £1 shares. Object, to acquire any patents, &c.

Iron-clad Rubber Tyre Syndicate (Limited), 110-111, Strand, W.C.—Capital, £2,500 in £1 shares. Object, to acquire the business of a manufacturer of metal-shielded rubber wheel tyres, carried on by J. H. Glew. First directors, J. H. Glew, J. F. Pridham, and H. W. Franks.

Motor Press (Limited).—Capital, £2,000 in £1 shares (1,500 ordinary and 500 six per cent. cumulative preference). Object, to adopt an agreement with H. Akerman, and to carry on the business of publishers, &c.

Saxon Motor Company (Limited).—Capital, £3,000 in £1 shares. First directors, T. H. Wright and A. Perman (managing director).

Starley (Limited), St. John's Works, Queen Victoria Road, Coventry.—Capital, £1,000 in £1 shares. Object, to manufacture and deal in motors, cycles, &c.

Velox Engineering and Autocar Company (Limited).—Capital, £2,000 in 10*s*. shares (2,000 deferred). Object, to adopt an agreement with the London Pioneer Syndicate (Limited), to manufacture and deal in motors, cycles, &c.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published March 31st, 1904.

27,095. J. F. PEASE AND E. SCHUMACHER. Wheels.

Applied for in 1903.

Published March 24th, 1904.

5,120. T. GARE. Resilient wheels.
7,256. E. C. HAWKINS. Explosion engine commutators.
9,426. H. SPUHL. Explosion engines.
9,836. E. F. BRADLEY and others. Internal combustion engines.
10,096. A. GUYON. Electric ignition.
10,425. R. BECKER AND A. REISSER. High pressure explosion motors.
12,094. W. O. COX. Frames of motor cycles.
14,726. TANGYES, LIMITED, AND J. ROBSON. Internal combustion engines.
21,308. X. WEHRLE. Motor fore-carriages.
23,493. W. PECK. Internal combustion engines.
26,872. A. HERISSON. Friction clutches.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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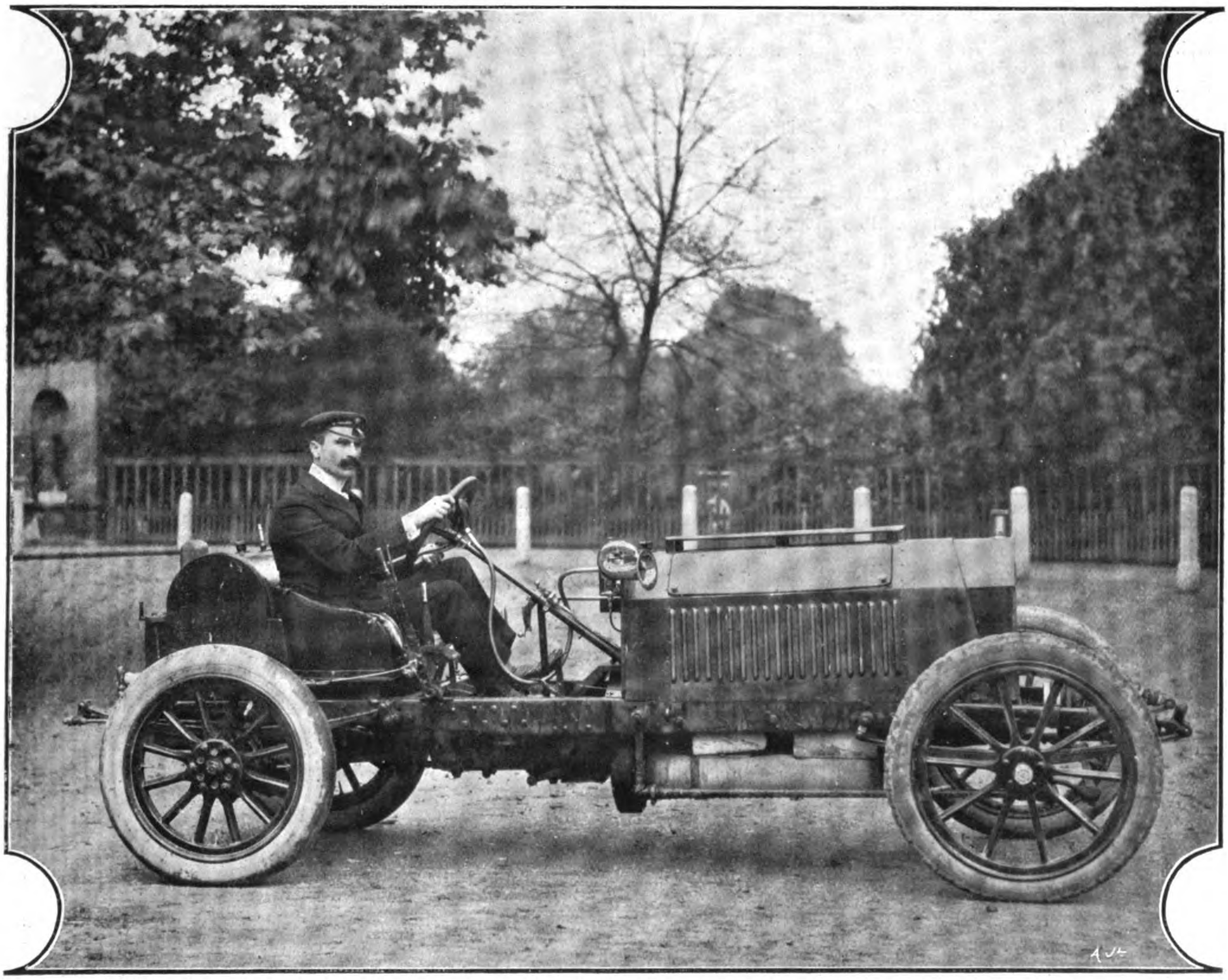

Already, in this country, as abroad, the cars which have been built for this year's Gordon-Bennett Race are beginning to make their appearance. The first to be completed by the Napier Company was the 100-h.p. built for Lieut.-Col. Mark Mayhew, of which we gave an illustration on Jan. 16th. Above is shown Mr. S. F. Edge on his new racer, which in general respects is of somewhat similar design. This vehicle has a 4-cylinder 80-h.p. engine, weighing only 500 lbs., and is fitted with multiple-seat atmospheric inlet valves. A direct-through-drive is obtained to the live-axle on the top-speed. The car weighs about 963 kilogs., and is specially designed for starting and stopping quickly. It has very long outside springs, a metal-to-metal clutch, and all four tyres are 870 mm. in diameter—90 mm. and 120 mm. wide, front and back, respectively.

THE AUTOMOTOR JOURNAL.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
Apl. 18–24 ...	*Side-Slip Trials.
May 7 ...	*Quarterly 100 miles Trial.
May 10 ...	British Gordon-Bennett Race Eliminating Trials.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
June 11 ...	Automobile Races, Ranelagh Club.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Apl. 4–9 ...	A.C. America Commercial Vehicle Trials.
Apl. 5–15 ...	Monaco Motor Boat Week (details, Jan. 2, p. 25).
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Paris-Nice-Rome.
Apl. 30–May 12	Antwerp Salon.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May 16 ...	Carburettor Trials (A. C. de France).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8–12 ...	A.C. Bordelais Automobile Week.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 16–23 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 15–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11 ...	Paris–Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The First Inquiry *re* the 10-Mile Limit.

No county has been more progressively tolerant or more friendly to the automobile movement than Hampshire. There is accordingly a suggestion of irony about the fact that the first district in which a local authority should have proved so obstinately determined on the introduction of the 10-mile limit—in spite of the dissuasion of the L.G.B.—as to necessitate the holding of a local inquiry by an inspector of the Board, should have occurred at Winchester. The inquiry opened on the 23rd, and the Winchester Town Council had a decidedly hard time of it. Their case was never a strong one. When it was concluded it seemed as if they had ceased to believe in it themselves. The A.C.G.B.I. and the Hampshire Motor Union co-operated in resisting the demand, and briefed Mr. Ricketts and Mr. Warner, secretary of the latter body. The Hon. J. Scott Montagu, M.P., always to the fore where there is a chance of benefiting the automobile movement, or preventing an encroachment on such rights as automobilists possess, was one of the principal witnesses examined. As he resides in the county, is a member of the Hants County Council, a magistrate for the county, a member of the Departmental Committee of the L.G.B. on Highways, and knows the town and district thoroughly, he was able to speak with some authority. Needless to say, he was strenuously opposed to the introduction of the 10-mile limit, as wholly unnecessary. It is particularly objectionable in the case of Winchester, as the proposal is to apply the limit to the whole of the borough, the outskirts of which are quite rural in character. A feature of the inquiry was the number of magistrates who gave evidence against the Town Council's proposals. Besides Mr. J. Scott Montagu, there were Col. Willan, chairman of the Southampton County Bench; Col. Stratton Bates, a magistrate of 41 years' standing; and Alderman Scott Foster, of Portsmouth, who pointed out that the streets of his town were quite as narrow as those of Winchester, and had tram lines as well. He mentioned that there had not been a motor car prosecution in Portsmouth for over a year.

The Town Council seemed to think, after the hearing, that their chances of success were extremely slender, and a rumour is in circulation that they intend "committing suicide to save themselves from slaughter"; *i.e.*, to save their dignity by withdrawing their proposal before the L.G.B. administers its *quietus*. This would be a most satisfactory result, and certainly calculated to encourage other reactionary local bodies *not* to place themselves in a similar predicament.

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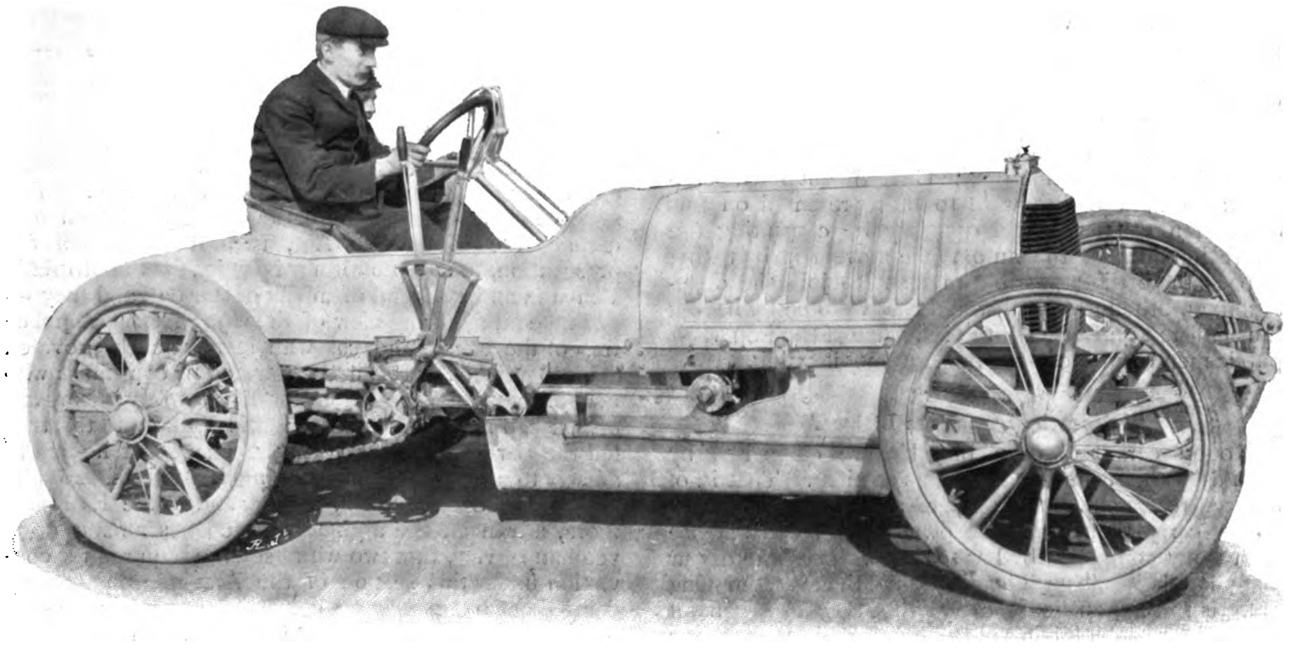
Alcohol as a Motive Power.

Every automobilist must feel an interest in the question of the satisfactory application of alcohol as a fuel for explosion engines, and we therefore desire to direct the attention of our readers to the able and exhaustive paper on "Alcohol as a Motive Power" read before the Automobile Club on Thursday in last week by Professor W. R. Ormandy, of Warrington, an excerpt of which we reproduce in another column. The technical questions involved are dealt with so compendiously and with such lucidity that we do not propose to enter upon any analysis of them here, and will merely remark in passing that Professor Ormandy lends his authority to the view of what we may call the "mechanism" of the alcohol explosion, originally put forward in the columns of The Automotor Journal; the main point of which is the repudiation of the thermo-dynamic theory concerning the effect of water in the cylinder of an internal combustion engine. We would merely draw attention to a few of the commercial aspects of the problem which Professor Ormandy brings out with special force. "Only about 2 per cent. of the world's output of crude petroleum is suitable for motor spirit." The demand both in this country and in America—owing to the rapid increase in the number of motor vehicles—is growing enormously. America can hardly continue to export, and the chairman of Messrs. Crosfield's—whom Professor Ormandy regards as the highest authority on the subject—is of opinion that



The Wolseley Gordon-Bennett Racer, which has recently run over the proposed Eliminating Trial Course in the Isle of Man. This fine-looking vehicle has a 4-cylinder, 72-h.p. horizontal engine, which is suspended in the front of the pressed steel frame. A single-jet automatic carburettor is fitted to it, and a flywheel of extra large diameter. A large radiator, in which a nest of tubes are fitted across inside a circular water-tank, forms the front of the bonnet, and there is a gear-driven fan placed immediately behind it. The change-speed-gear provides four forward speeds and a reverse, and all the gear-shafts run on ball-bearings; the gear-box has a 3-point suspension. The hand-levers controlling the time of ignition and the throttle are mounted on the steering-pillar, and are so shaped as to be operated from above the wheel; the pillar itself is placed at an angle of 35 degrees. The commutator and the petrol and oil supplies are so arranged as to be under the immediate observation of the mechanician. Both axles are steel forgings, having an I section, and, as seen in our illustration, the artillery wheels are reinforced with wire spokes to take side-strains. The wheel base is 8 ft. 7 ins.. the track 4 ft. 6 ins., the front wheels have 34-in. by 3½-in. tyres, and the rear wheels are shod with 36-in. by 5-in. tyres. Two sets of brakes are fitted to the driving-wheels, those of the internal Wolseley pattern being operated by foot, and the external band-brakes by hand. The shape of the body is well shown in our photograph. We understand that in its road trials the car has proved itself to be satisfactory in every way, and very reliable, its chief features being stability, easy running at high speed, and capability of taking corners when travelling fast owing to the low centre of gravity secured.

unless some new source of supply is discovered, prices are bound to go up, and quality to continue to go down. A not unimportant minor question is the provision of fuel for submarine boats. At present they rely on petrol. In time of war the supply might be cut off.

Another subject for thought, of considerable interest, is provided by the enlightened policy of the German Government on the alcohol question. In 1887 the cost of commercial alcohol in that country was from 3*s.* 6*d.* to 4*s.* per gallon. Now it can be obtained at 9*d.* per gallon in 1,500-gallon lots, 10*d.* per gallon in 40-gallon lots, and in very small quantities at 1*s.* 3*d.* per gallon—even at which highest price it is still cheaper than petrol at 1*s.* 6*d.* In view of this object-lesson, the persistent—one might really almost say the obstinate—refusal of the British Government to afford legislative relief is surely a matter of considerable mystery. It is not for want of sufficient asking at any rate that the British Government maintains this attitude. The chemical trades, through the Society of Chemical Industry, have over and over again returned to the charge, asking for an alteration in the laws relating to the taxation of alcohol, but with practically no result. The Manchester Chamber of Commerce, representing what is probably the greatest centre of chemical manufactures in the country, has continued the agitation, with the result that a resolution has been presented to the Associated Chambers of Commerce of Great Britain, requesting the Government to further consider their position on the alcohol question, and asking for permission to allow a deputation to wait on the Chancellor of the Exchequer to present their case. Here is an opportunity for the A.C.G.B.I. and associated bodies. It could not fail to have a beneficial effect, and conduce to favourable consideration by the Government if the club and associated bodies were to be represented on this deputation. They would certainly be consulting the future interests of the automobile movement by taking steps at the earliest possible moment to join the deputation, and the movement would gain in force by having thus enlisted on its behalf the influence of the important public men connected with the Automobile Club.

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"When the Lamps are Lighted."

Motor cars and even bicycles are compelled by statutes of the realm to carry lights at night. That is, of course, reasonable and proper, and they would, no doubt, carry them for their owners' own convenience even if not compelled by law to do so. It is one of our many legislative absurdities that while the fastest moving traffic is thus compelled to carry lights, there is no general law of the realm obliging horse-drawn vehicles, however slow and lumbering, to illuminate themselves after dark. It is true they are, generally in England at any rate, compelled to carry one light in front (on the right-hand side), but this is by local bye-laws of county councils and other local authorities. There are a few places where no such bye-laws are in force, particularly in Scotland, while throughout the whole of Ireland the custom of lighting up after dark is universally honoured "in the breach," and not "in the observance." Indeed, when a measure of reform was proposed for Ireland in this respect, it was bitterly opposed by Mr. Tim Healy, who, in accents quivering with indignation, exclaimed that if this Bill passed into law it would "compel every unfortunate Irish peasant to tie a light on the *wings of his donkey!*"

There is no greater danger either to himself, or other users of the roads—particularly automobilists—than a man meandering about them in a cart after dark, without a light; and it is nothing short of a scandal that his punishment should be left to local bodies to provide for or not as they think fit. Hardly less essential is it that such vehicles should be compelled to carry rear lights. Motor cars, the fastest things on the road, are compelled to do so. It is a cynical absurdity that the slowest moving vehicles should be exempt from this obligation. The matter ought to be dealt with by Government, and a Bill introduced making it universally obligatory throughout the realm for *all* vehicles to carry both front and rear lights. In the present condition of Parliamentary business, however, this proposal is somewhat a "counsel of perfection"—there is little chance of such a Bill being passed for some time. It is, therefore, satisfactory to find that the Motor Union are taking steps to improve matters, generally, pending proper legislation. The Home Office could probably do a great deal by putting pressure on local authorities to induce them universally to promulgate proper bye-laws. The Motor Union has, therefore, decided to arrange deputations to call on the Home Secretary to advocate action of the kind, and they propose to circularise local authorities on the subject. They likewise suggest introducing a Universal Lights Bill into Parliament, and sending a deputation to the President of the Local Government Board to ask his support to such a measure. We trust this propaganda may be productive of satisfactory results.

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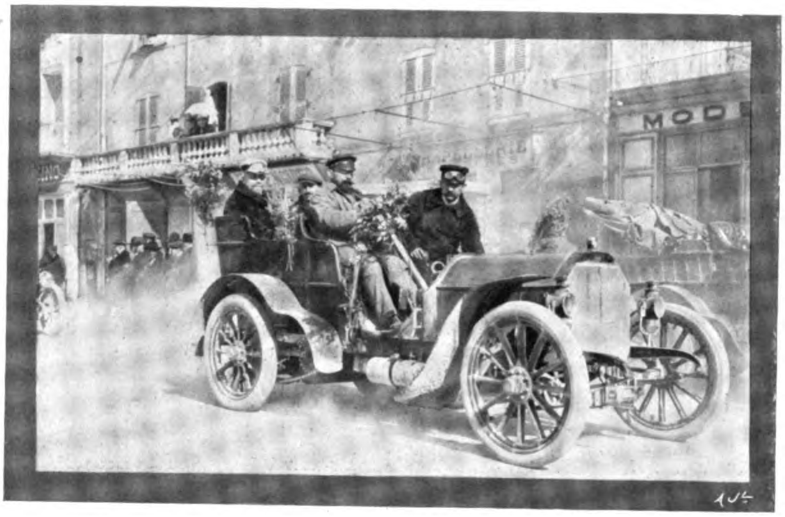
A Matter of "Opinion."

Barristers sitting as magistrates on a bench might be expected to form an almost ideal legal tribunal. The sensible views enunciated by the Mortlake Bench concerning the Motor Car Act, in a recent motor car prosecution, tend to confirm this belief, for the Mortlake Bench includes several members of the Bar, and they do not take an admiring view of the 1903 Act. A police trap of the usual kind, set with stop watches provided at ratepayers' expense, and brandished by constables who may or may not have understood how to use them, was established near Hammersmith Bridge, and into this trap fell the Earl of Wicklow, with the result that he had to answer to a summons for driving beyond the 20-mile limit. Mr. Staplee Firth, who defended the Earl once more, advanced the argument which has already done yeoman service, that two witnesses are required for conviction under this section of the Act—the phraseology being that no one may be convicted under this section on the "opinion" of one witness only. The learned members of the Bench expressed themselves forcibly on the bad drafting of this portion of the Act, and declared that never in their experience had they encountered the word "opinion" used in such a sense. Does it mean evidence or does it not? In the end the case was dismissed, and most people will be disposed to join with the chairman in the hope that the matter may be thrashed out in the High Court. Probably what the framers of this wonderful section had in their heads was that, in cases where a driver is accused of exceeding the 20 miles per hour, one policeman should be able to *prove* the speed and a second should be ready to make a statement backing the first man up, but not sufficiently precise to be taken as evidence by itself—altogether a pretty sample of law-making!

NICE AUTOMOBILE WEEK.



NICE AUTOMOBILE WEEK.—The Tourist Run. Prince Lubecki on his 60-h.p. Mercedes.

SINCE the opening day of this important meeting, the interest in the various events has not flagged for an instant. From all parts of the Continent an enormous influx of visitors has taken place, so that even for Nice at this time of the season the place is unusually crowded. Following the first day's tourist run on the 22nd, to which we referred in our last issue, the finish of this part of the week's programme took place in glorious weather the next day—Wednesday. On this occasion an important attraction was the timing for speed over a measured stretch of 2 kiloms. on the Esterel Hill at the Saint Jean Bridge. Of the nineteen cars which started from Nice for the 312 kilom. run, all successfully accomplished the full distance in good time, ranging from about 9 to 10 hours gross, including all stops for meals, &c. The route taken upon this occasion was *via* Cannes, Agay, Nouvelle Corniche, Saint Maxime, Saint Tropez (where a halt was called for *dejeuner*), Cogolin, Gremaud, Le Duc, Le Muy, Frégus, Esterel, and Cannes back to Nice. Most glorious scenery is traversed by this road, which at times causes a pang of regret that automobiles travel all too speedily to allow of the full appreciation and enjoyment of the ever-changing and magnificent series of unexampled views which follow each other in one continuous panorama. Good speeds were made on the Esterel Hill, the stiffest 2 kiloms. being selected for the test. Annexed are the official times recorded, the time being taken from a standing start and again when each car had come to rest at the finish.

Upon the return journey at Agay, a little mild excitement was aroused by arrival of the special train from Paris, conveying the large contingent of motor boats for the Monaco Exhibition.

A rest was indulged in on the Thursday by way of preparing for the paper-chase, down for the next day—Friday, and the more exciting events to follow during this week. M. de Millo, on his 14-h.p. Renault car, secured the honours of the paper chase by being first in. The route was so arranged that, the cars starting from the A.C. Nice club house, returned several times to the same spot, passing and re-passing, therefore, the club house, and thereby maintaining the interest unbroken

—	Driver.	Car.	Seats.	Time.	
				m.	s.
1	Giraud ...	40-h.p. C.G.V.	2	3	4⅕
2	M. Coste ...	20-h.p. Pilain...	3	3	24⅖
3	Martini ...	16-h.p. Martini	2	3	37⅕
4	Garin... ...	16-h.p. Rochet-Schneider ...	3	3	56⅕
5	Prince Lubecki	60-h.p. Mercedes	4	3	57
6	Parran ...	40-h.p. Berliet	4	3	59⅖
7	Clerissy ...	16-h.p. Rochet-Schneider ..	3	4	12⅕
8	De Milo ...	14-h.p. Renault	3	4	38
9	Rosset ...	20-h.p. Pilain...	4	4	43⅖
10	Barillon ...	12-h.p. Mors	4	5	23
11	Blanc... ...	8-h.p. De Dion	2	5	36⅕
12	D'Arco ...	Neue Auto Ges.	4	5	45⅕
13	Guidé... ...	14-h.p. Renault	2	5	57⅘
14	Thyssen ...	16-h.p. De Dietrich	4	6	0
15	Gautier ...	8-h.p. De Dion	2	6	35⅗
16	Liegeard ...	16-h.p. Peugeot	2	6	48
17	Thorrand ...	8-h.p. De Dion	2	6	51
18	Cuenod ...	16-h.p. Martini	3	7	51
19	Gueyrand ...	14-h.p. Renault	2	8	25

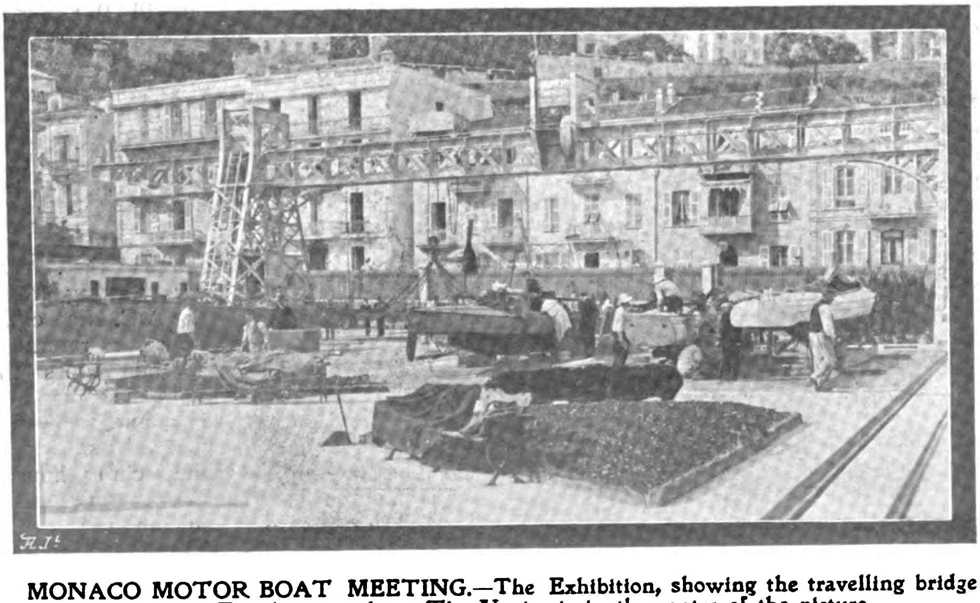
NICE AUTOMOBILE WEEK.—The tourists during the mid-day halt for "dejeuner" at St. Tropez.

NICE AUTOMOBILE WEEK.—MM. Paul Chauchard, Jacques, and Charles Gondoin in a Panhard Car, "laying the trail" in the paper chase, in which M. de Millo secured first place.

up to the finish. The distance was about 60 kiloms., and every car had to be checked through eight "controls." The trail was laid by MM. Jacques and Charles Gondoin and M. Paul Chauchard. On Saturday another "rest" was the order of the day, and on Sunday the scene was to be shifted to the Place du Jardin Public, where the promised *Corso Fleuri* drew together an enormous throng to feast their eyes upon the exquisitely decorated cars taking part in this portion of the festivities. About 40 entries were received; but, alas, owing to the heavy rain this event was postponed until Monday, when M. and Mdme. Munro and M. and Mdme. Schwab tied for first prize. The mile record races were postponed until Thursday. Enthusiasm reigns high over this event and the Coupe Henri de Rothschild. Baron de Caters, for family reasons, may refrain from taking part in the attempts at the records, Baron de Crawhez acting as his substitute. The Rothschild Cups, which this year are to be run for on the extended Promenade des Anglais, and the De Caters Cup, form the most attractive features of the entire meeting. In 1901 Baron Rothschild offered a splendid trophy for speed competition, open to automobiles of any type between the weights of 650 and 1,000 kilogs., carrying two passengers side by side, over a flying kilom., the Cup to become the property of anyone winning the event three times, whether consecutive wins or otherwise. M. Leon Serpollet, in his steam racer, accomplished this feat in three consecutive years, and therefore became in 1903 the happy possessor for all time of the first Rothschild Cup.

NICE AUTOMOBILE WEEK.—One of the Rochet-Schneider tourist vehicles which took part in the Run. A halt at St. Tropez.

Baron Rothschild, immediately it was known the Cup had been "lifted" permanently, announced the offer of another to take its place, upon exactly the same conditions, and it is this trophy which on Monday was the chief prize to be striven for. The leading racing "cracks" were entered to compete, British Napier cars having a prominent place in the list—two of these being entered by Mr. Mark Mayhew and Mr. S. F. Edge, respectively. Amongst other entries for the speed events are five Mercedes cars driven, respectively, by MM. Werner, Jenatzy, Braun, Fletcher, and Warden. The 1903 Gobron-Brillié will be driven by Duray, Rigolly driving the 1905 racer. Rigolly's new Gobron-Brillié turns the scales at 998 kilogs., and is credited with a speed of 140-k.p.h. She was driven from Paris to Nice in two days.



MONACO MOTOR BOAT MEETING.—The Exhibition, showing the travelling bridge crane. Finishing touches. The Napier is in the centre of the picture.

MONACO MOTOR BOAT MEETING.—A view of the Exhibition Building, which has been specially constructed for the Exhibition of Motor Boats. This was opened to the public on Wednesday last. Our photograph shows the arrival of one of the boats from the special train chartered to bring a collection of the exhibits from Paris to Monaco.

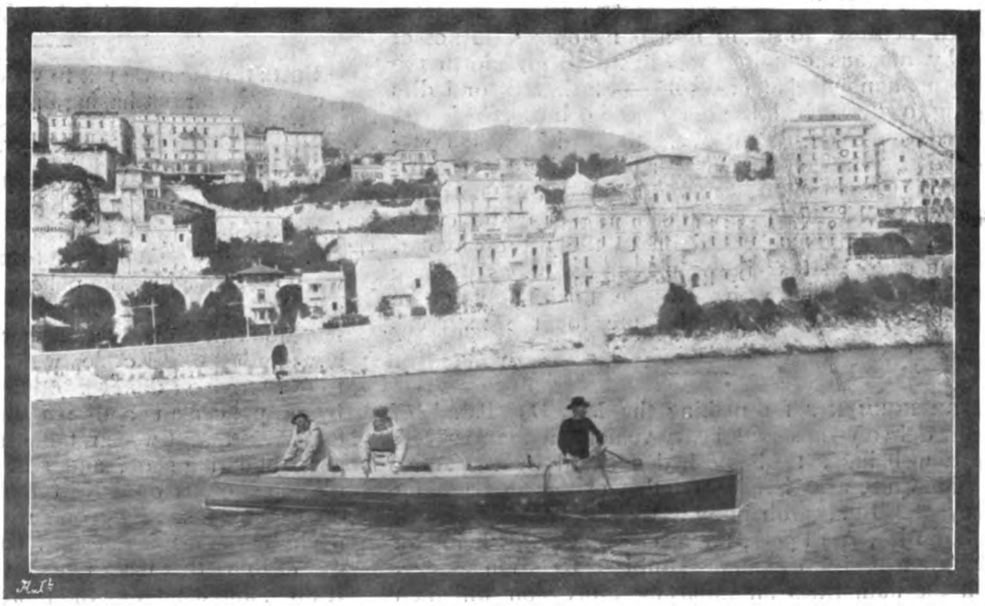
M. Serpollet's performances for the kilom. were :—

1901, time 35⅘ secs. = 100·55 kiloms. per hour (62·48 m.p.h.).
1902, ,, 29⅘ ,, = 120·80 ,, ,, (75·06 ,,).
1903, ,, 29·19 ,, = 123·29 ,, ,, (76·60 ,,).

Another important prize announced for the same day is the second Baron H. de Rothschild Cup, open for competitors to vehicles from 650 to 1,000 kilogs. in weight, driven by an explosion motor, and carrying two passengers side by side. This was competed for last year for the first time, and was secured by Hieronymus, with a Mercedes car, in the time of 31·76 secs. = 113·328 kiloms. per hour.

Subject to official sanction being obtained for the race to be held during the week, the much-coveted cup presented by Baron de Caters on Friday should be an exciting item. The conditions governing this event are that competitors shall race from standing over a distance of 1 kilom. on a hill having a not less average rise than 10 per cent. It is open to every type of automotor vehicle without distinction by category and without limit of weight. Any competitor winning this cup twice, whether consecutive wins or otherwise, secures the trophy permanently. It was instituted in 1902, when Leon Serpollet, with his steam racer, secured the first win on the Corniche road in 59⅕ secs. Last year Louis Rigolly, on his famous 100-h.p. Gobron-Brillié car, on the Laffrey Hill, was winner, beating Serpollet's time by 9 secs. It is sought this year again to run off the race on the Corniche Road, instead of on La Turbie Hill, the scene of the lamentable accident to Count Zborowski last year. Failing, however, official permission being accorded, no doubt, following last year's precedent, the event will be postponed until a later date at some other important meeting like Laffrey.

Monaco Motor Boat Races.—On Monday next, the 4th inst., the elaborate programme for the Motor Boat Races to be held in Monaco Bay will commence. The list of 76 entries received, including the finest speed boats in Europe, should ensure a magnificent series of races during the meeting. Altogether over 100,000 francs will be given in prizes, in addition to a splendid cup, of the value of 5,000 francs, which has been presented by Prince Albert of Monaco. This will become the actual property of the winner of the kilometre and nautical mile races. In our issue for January 2nd (page



MONACO MOTOR BOAT MEETING.—A view of the Bay, showing the "Princess Elizabeth" taking a turn round the port. This boat is fitted with a Delahaye Motor, the hull being the work of Tellier.

25) we gave a very full summary of the regulations and the classes, &c., governing these marine races. The meeting has been organised by the International Sporting Club of Monaco and *L'Auto* conjointly. The photographs which we publish this week are interesting in showing the special efforts which have been made by the organisers to ensure the preparations being on a scale worthy of so important a meeting. Besides the Napier motor boat there will be several powerful monsters, one in particular, viz., the sixty-footer 180-h.p. Fiat, which has a total piston displacement of 28 litres. The races will extend from April 4th to 10th. On the last day the kilometre and mile events will be decided.

MONACO MOTOR BOAT MEETING.—One of the racing craft being hoisted into the Exhibition building on the left. The boats will be afterwards transferred by the same means on to the slip on the right, preparatory to taking the sea for the races commencing on April 4th.

ALTHOUGH the knowledge shown generally by prospective purchasers of automobiles has made enormous advances compared with experiences in the early days of Exhibitions, there are still many instances of somewhat amusing queries being raised by the budding amateur who is desirous of displaying his knowledge of what things ought to be. A yachting contemporary mentions one or two amusing incidents in this direction in relation to motor boats. One anxious enquirer at the Agricultural Hall Show refused to purchase a motor launch because, forsooth, it had no brakes. Another equally anxious enquirer was heard to give forth the following announcement:—" Beastly awkward for ladies having to step so high to get into these boats, don't you know. Can't you fit side doors to 'em ? " The up-to-date representative of the motor boat builder had sufficient presence of mind to murmur, " We don't fit doors as a general thing, but we can if the customer so desires," and then collapsed on to the nearest motor. The query of another individual was, that, as primary batteries are credited with a N. pole, might they not be available for use as a substitute for the mariner's compass.

ARRANGEMENTS for making the May Day Parade of motor delivery vans and heavy vehicles a huge success are now being actively pushed forward by the Automobile Club, who have taken this matter in hand for this year. In all probability it will be held at 3 o'clock on Saturday, April 30th, the place of assembly being on the Thames Embankment. Subject to arrangements with the authorities an imposing procession will then take place, which, judging by the initial effort made last year through the efforts of the Thornycroft Steam Wagon Company, Limited, should be a magnificent object lesson of the remarkable advances which are being made year by year in the increased use of automobiles for commercial purposes. The object of the Parade itself is mainly to encourage the drivers of this class of vehicle to pay careful attention to their machinery with a view of reducing wear and tear and cost of upkeep. Money prizes will be given to the drivers for the best kept vehicles, and it is hoped that a very large number of users of commercial vehicles will arrange for their drivers and vehicles to attend on the day.

SOME time ago we put forward the view that to punish a car-driver for not having his licence with him, under all circumstances, was interpreting the Motor Car Act very harshly, and in a way the phraseology of the section hardly warranted. We are glad to find that a sensible magistrate has taken the same view. A motor cyclist, Mr. E. Kingzett, of Chislehurst, was summoned before Mr. Baggallay at Woolwich for not producing his licence when demanded by the police. The circumstances were as follows: Having run short of petrol, he took his machine to a shop for a further supply, and when there saw another motor cycle, which he asked to be allowed to try. While riding this other machine he was stopped by a policeman and his licence demanded. He explained that it was in the case of his own machine at a neighbouring shop, and that he was only trying the machine he was on. Nevertheless, the policeman took out a summons. Everyone will agree with the remark made by the magistrate, Mr. Baggallay, that " this is the sort of thing that makes people so angry with the police." It does, and some day the powers that be will, we hope, awaken to the fact that it is not wise to be constantly making the respectable classes of the community " angry with the police."

THE GORDON-BENNETT TRIALS AND RACE.

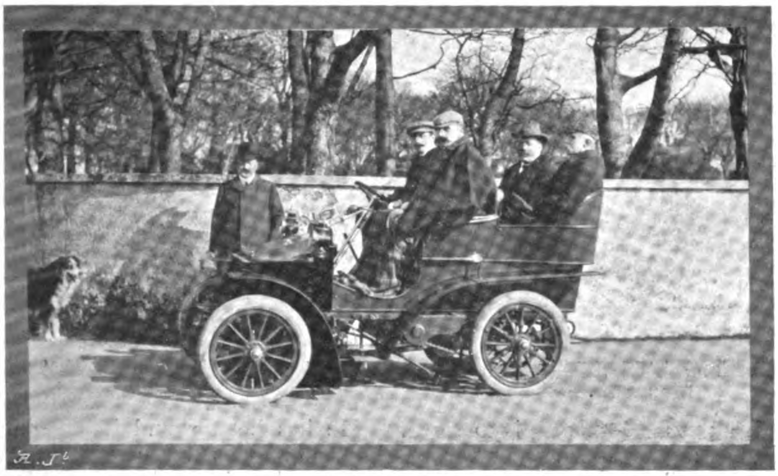


Photo by D. Collister.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Lord Raglan, the Governor of the Isle of Man, and his official party, with Mr. Julian W. Orde, the Club Secretary, inspecting the Course last week on a Wolseley Car. Mr. Orde is at the steering wheel, and Lord Raglan is seated by his side. Behind Mr. Orde is Deemster Kneen, and behind Lord Raglan is Col. Freeth. Standing on the other side of the car is Mr. G. Drinkwater, the son of Sir William Drinkwater, who reached the age of 92 on Monday last, March 28th. Sir William was for 50 years Deemster of the Island, and was succeeded by Mr. Kneen, who is in the car.

LAST week we were able to publish a minute description of the first route tentatively suggested for the British Eliminating Trials for the Gordon-Bennett Race in the Isle of Man, and we also gave some exclusive photographs of this road. As we announced briefly, it has been practically decided, after careful inspection by the Lieut.-Governor in conjunction with Mr. Orde, the club secretary, to vary the route originally selected. The main object is to avoid traversing any thickly inhabited towns, so as to reduce to a minimum all chance of danger to the public. In addition to Lord Raglan, the Governor of the Island, Deemster Kneen and Col. Freeth accompanied Mr. Orde on his Wolseley car, making a complete tour round the proposed course. At Castletown they were met by the other members of the Highway Board, of which Deemster Kneen is the chairman. Subsequently Mr. Orde took the Mayor of Douglas and the Town Clerk for a spin in his car to enable them to fully appreciate the pleasures of motoring. The chief changes which it is proposed to make are that instead of the circuit starting from Douglas in a northerly direction, the cars shall travel in a southerly direction towards Ballasalla, the starting point being on the Quarter Bridge Road, between Woodlands and Bray Hill, a photograph of which was shown in our last week's issue. The road would then go over Richmond Hill and through Ballasalla, on to Castletown, avoiding the narrow and busier streets of the latter town. From this point the route will turn northwards to Foxdale, Ballacraine, Glen Helen, Creg Willey's Hill, Kirk Michael, and Ballaugh. It is at this point the extended portion starts, and this has also been carefully inspected by Mr. Orde and Lord Raglan. This extension, instead of going along the ordinary high road from Ballaugh to Ramsey, turns off at the left, past Ballaugh Old Church to Jurby, and then past Sandy Gate and St. Jude's to Ramsey. By adopting this way of the circuit the cars will have to ascend Richmond Hill and Creg Willey's Hill instead of descending them. By way of compensating for this, however, the competitors will have a rather steep downgrade from Snaefell, as it has been decided that from Ramsey the road taken shall be by the new mountain road over Park Llewellyn and the shoulder of

Photo by D. Collister.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—At Cronk ne Mona. The starting point for the climb up Snaefell Mountain.

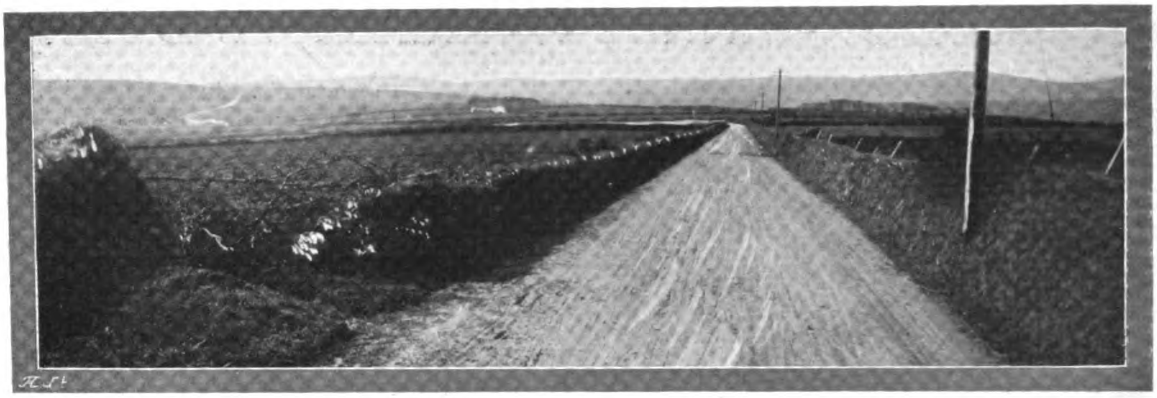


Photo by D. Collister.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—A fine stretch of road on the way up Snaefell Mountain.

Snaefell down the hill past Creg-na-baa, back to Douglas. Laxey and Onchan will, by this change, not be passed through, and the establishment of "controls" in these places will, therefore, not be necessary. The difference in the mileage is but slight, and will not vary the total of about 50 miles. This circuit will be covered six times.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Nearing Keppel Gate Hotel, Snaefell Mountain.

Mr. A. Rawlinson, who drove his racing Darracq, considers the course an excellent one for the purpose which it is to serve. He has been round it at racing speed wherever possible, and does not consider that there are any turns or stretches in it that are at all difficult of negotiation when compared with many courses on the Continent, and as a test for good driving it should prove instructive. Mr. Rawlinson has had a considerable experience in racing abroad, and his opinion, therefore, is extremely valuable in this respect. The Snaefell Mountain road, which gives a rise of 1,384 feet in 6 miles, he considers the finest road for a trial of racing

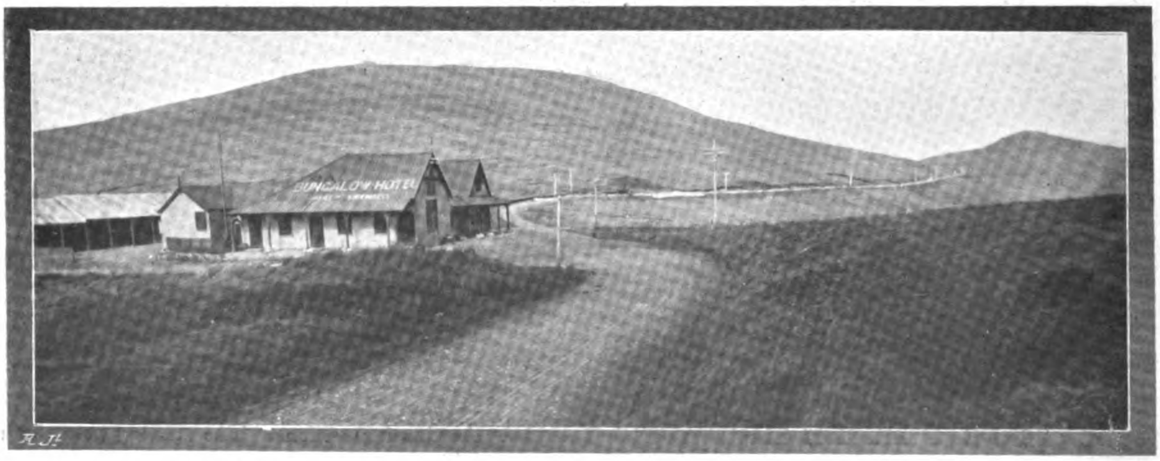


Photo by D. Collister.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—At the summit of Snaefell, Mona's highest mountain.

cars that he has ever seen. No dangerous turnings, but nearly all of them gradual curves. Craig Willie's Hill he thinks is somewhat difficult, but as the cars will be taking this on the upward grade and it is very steep no trouble should arise from excessive speed, as in all probability none of the racers will be able to take this on the top speed.

The starting point at Quarter Bridge is shown on our map by a circle, and the only really bad point on the entire course is near where the road goes under the railway bridge just by Lower Foxdale. This spot we have indicated by a cross, and arrows indicate the direction in which the cars will travel round the island.

The greatest enthusiasm prevails already throughout the island at the prospect of holding the race there, and there is no doubt that everything will be done by the local authorities in seconding the efforts of the Automobile Club to such an extent that the Eliminating Trials are likely to prove only of second interest to the race itself.

On Monday last a public meeting was called by the Mayor of Douglas at the Town Hall, with the main object of forming a guarantee fund to meet the necessary expenses in connection with the race. The authorities have undertaken to guarantee half the outlay incurred. It is proposed to arrange a three days' programme in connection with the trials. The first day the Eliminating Tests will take place, on the second day hill-climbing competitions are proposed in the neighbourhood of Ramsey, and on the third day speed races on the magnificent Douglas promenade. The Manx highway authorities are co-operating with commendable promptitude in getting the island roads into excellent order, and there appears to be a strong inclination to give automobilists upon their visit to the island such a magnificent reception that the Isle of Man for the future may be selected as a regular venue for the holding of all speed automobile events.

Mr. G. GILLMORE, of Douglas, is taking a particularly active part in urging everybody concerned locally to be up and doing in good time, so as to be prepared for the influx of visitors likely to occur. He has drawn up a number of hints of what it will be necessary to provide so that visitors may not, when they get over, find they can get nothing, and go away grumbling. He is giving suggestions which will ensure adequate storage room for cars being provided, and points out that preparation should at once be made for the erection of stands, temporary sheds, refreshment tents on the route, &c. Car owners are advised to make arrangements for the convenience of passengers, and farmers along the route are asked, even at the present time, to arrange to keep their gates shut so that cattle may not stray on the roads, as, it is pointed out, that a number of automobiles are likely to be running round the island considerably in advance of the actual time for the race. Mr. Gillmore winds up his hints by saying that he noticed in Ireland, during the race there last year, that Paddy kept in good temper all the time, whatever happened, and that that went a long way towards the great success of the races in the Emerald Isle. He calls upon the Manx people not to let Paddy, therefore, out-do them on this score.

Mr. Gillmore is the manager of the entire telephone system of the island, and his help in enabling the various officials during the race to keep in touch with each other will be invaluable. He has, we understand, offered to place telephones practically at any points within reason entirely free of cost to the club.

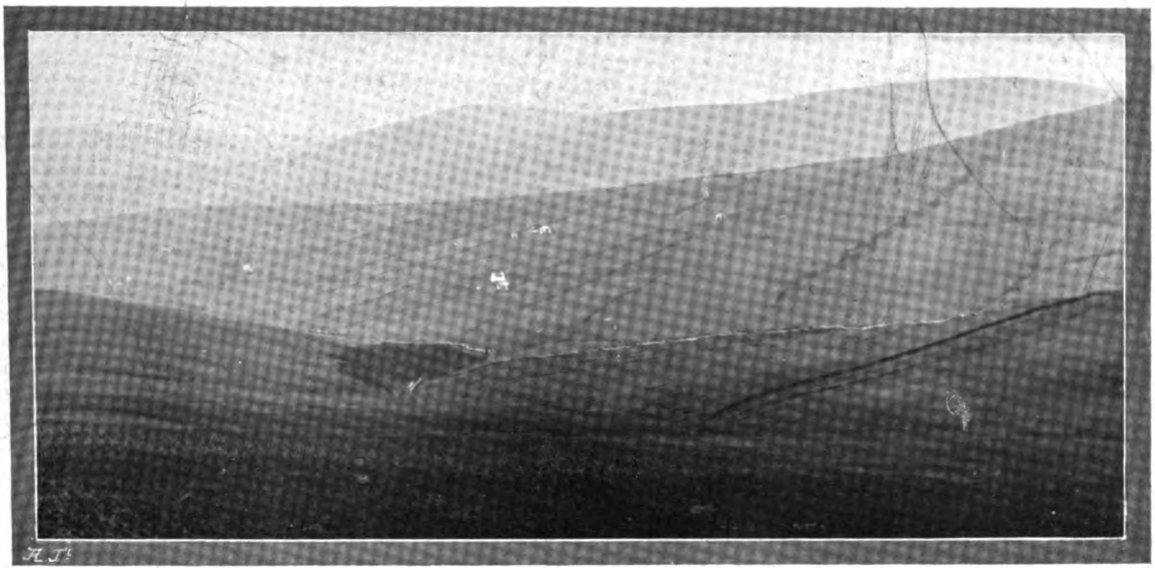


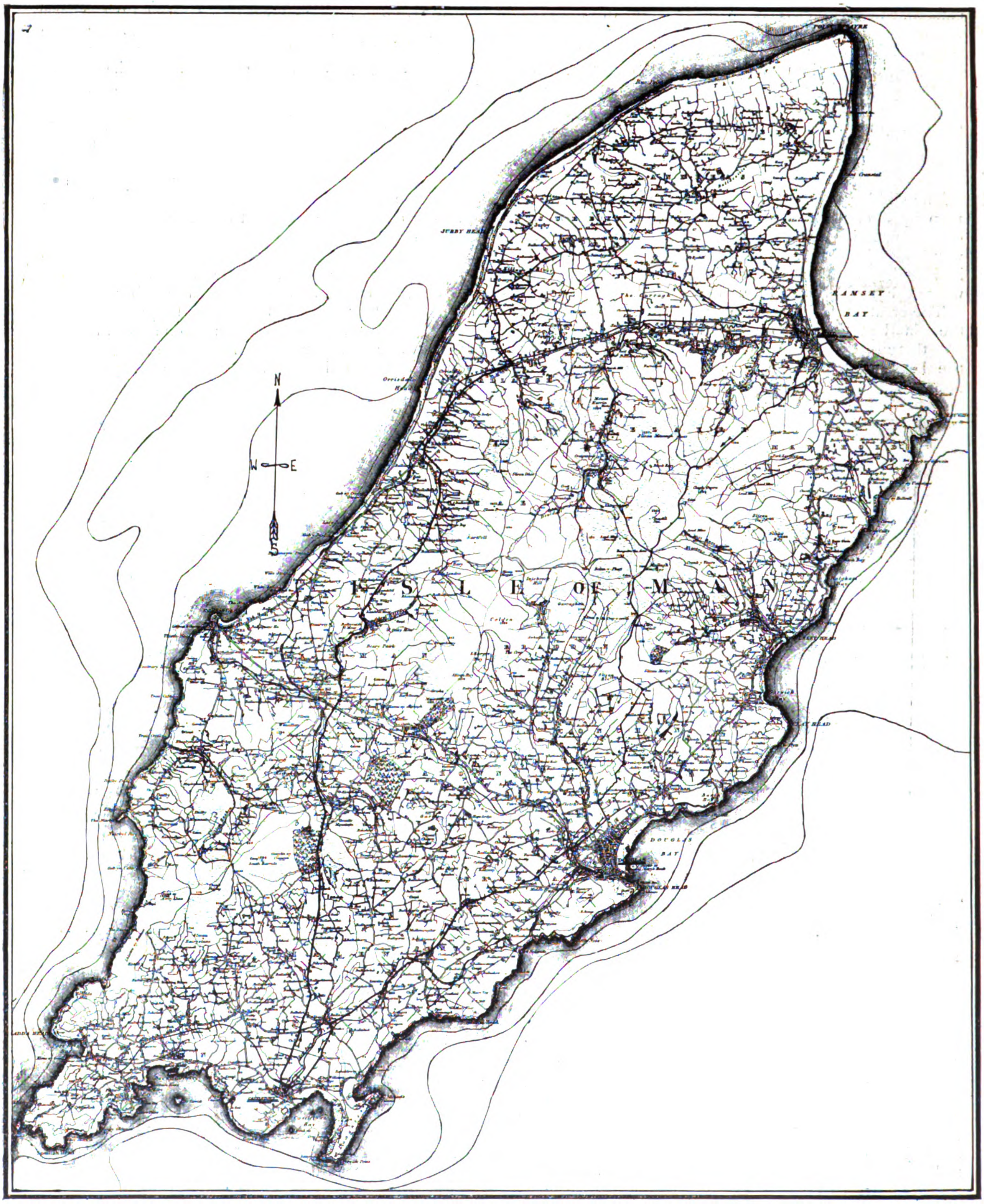
Photo by D. Collister.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—A wild scene adjoining the new Isle of Man course.

GORDON-BENNETT ITEMS.

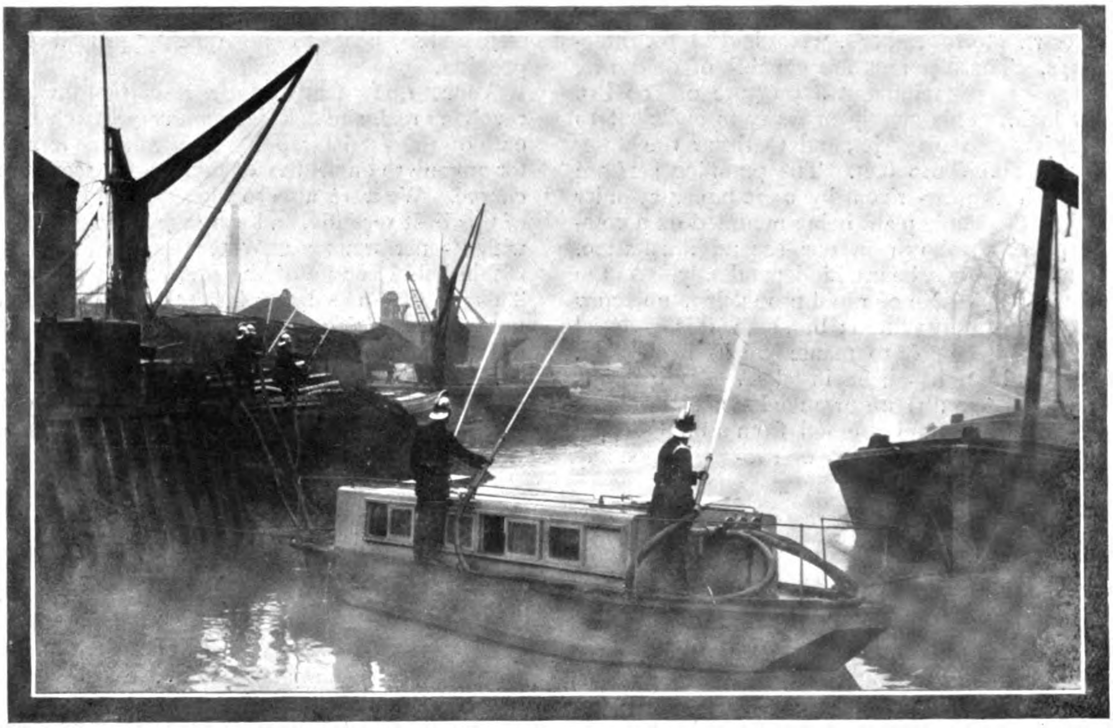
Joseph Tracey is given as one of the drivers for the Peerless cars which will compete in the American Eliminating Trials.

From the accommodation already secured at Homburg on behalf of various royal personages to witness the Gordon-Bennett Race in the Taunus, the event promises to be one of the most important gatherings ever held in Germany.



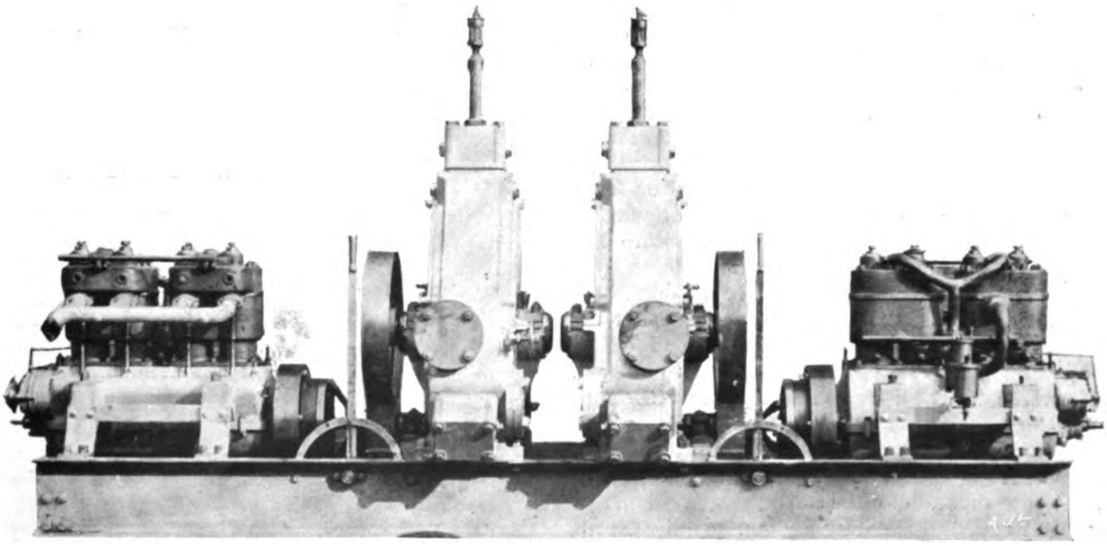
GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Map of the Isle of Man, showing the course. The selected route is shown by the thick line. The starting point is denoted by a circle, and the direction in which the cars will travel by arrows.

A PETROL MOTOR FIRE BOAT.



The Merryweather Petrol Motor Fire Boat in action.

Petrol motors have long established their claim to prior consideration as a propelling power on both pleasure and racing boats, chiefly by virtue of their lightness and small occupation of space; it is, therefore, by no means remarkable that such a progressive firm as Messrs. Merryweather and Sons, who have already had experience with petrol land fire-engines, should have recognised their peculiar adaptability to the other branch of their industry, and have installed them on a motor fire-boat which they have just constructed for Messrs. Huntley and Palmer, of Reading. The boat has been specially designed to have a very shallow draught—only 2 ft. 6 ins.—and has extremely little head room, as it must be able to pass under a bridge which stands only 4 ft. 6 ins. above water level. From an artistic point of view the boat is not beautiful, although from a purely utilitarian standpoint it would be hard to find anything more entirely suited to its purpose. The firemen are



View of the Pump Machinery on the Merryweather Petrol Motor Fire Boat.

free to direct the jets from a very roomy deck, which is quite unobstructed by smoke stacks or other erections.

In all, six jets are provided, and they are fed from a pair of Messrs. Merryweather's, "Hatfield" type, three-throw pumps. These pumps are capable of delivering about 600 gallons per minute at a pressure of 100 lbs. per square inch. This supply of water is sufficient to feed six ½" jets or one 1⅝" jet, and to throw the water to a height of about 100 feet. The pumping sets are separate; each is gear-driven by a 30-h.p. 4-cylinder petrol engine, the whole plant being mounted on a common bed plate, as shown in our second illustration. Either pumping set may be used independently. As the boat need not be capable of rapid propulsion, no screw propeller of any kind is fitted; but, since it is essential that the boat shall be able to manœuvre itself unaided, hydraulic propulsion has been installed. Four ½" jets (two forward and two aft) are arranged horizontally just above the water-line, and are fed from a branch pipe off the main supply. By means of two-way cocks, any jet, or pair of jets, may be separately brought into action, and, if necessary, the pumps may be utilised for propulsion only. The reaction of the water issuing from the jets, at such a high velocity, is quite sufficient to enable the boat to be quickly propelled into any position.

About 1,000 feet of hose is carried on board on a revolving reel, situated just under a hatch over the aft end of the engine-room. This renders it unnecessary for anyone to enter the engine-room except the man in charge. We were able to witness a very successful trial of this boat recently, and were very favourably impressed with its performance. Water was obtained at the jets within half a minute of the engine-man going on board. This property of starting instantly renders petrol motors unrivalled for this class of work, where the first five minutes may be worth the next half hour in putting out a conflagration. In the case of a private plant, the expense of keeping a boiler under steam year in and year out is prohibitive, and in itself is often sufficient to debar the use of a steam motor fire boat.

THE HUTTON PETROL CAR.

The Hutton Carburettor.

As already pointed out, the carburettor employed on the new Hutton chassis differs in many important respects from others that are now on the market, notably in being made entirely of aluminium, but chiefly because no attempt is made to maintain a constant degree of richness of the mixture. The construction of this carburettor is well shown in Figs. 9 and 10, in the former of which the various parts of one of them (some unfinished) are shown separately, and in Fig. 10 the mechanism is shown sectionally.

The main casting, A, contains the annular float, A^3, which regulates a valve in the base in much the usual way, controlling the flow of petrol from the fitting, A^1, beneath it. The petrol is led into the fitting, A^1, by the pipe connection, A^2, and it will be noticed that a large gauze filter is arranged so that the whole of the petrol has to pass through it. The portion, A^1, forms a large chamber beneath the filter, so that there is quite a large space for any foreign matter or water that may enter with the petrol to settle, and these can from time to time be drawn off by a cock which is screwed into the bottom of it. Another casting, A^4, is fitted immediately above the float-feed chamber, and a portion of it projects down to form a central boss inside the float. Inside this projection, the spray jet, A^5, is inserted from beneath, so that the jet is not only very readily accessible, but is in unusually direct communication with the petrol in the float chamber. The jet is surrounded by a sleeve, A^6, which screws down from above through and into the casting, A^4, so that it leaves a space for air between itself and the casting, A^4, above the level of the jet. The sleeve, A^6, is slotted opposite to the jet, so that the air can find its way into the sleeve through these slots.

Outside the upper portion of the sleeve, A^6, a sliding valve member, A^7, is fitted, and this can be moved up and down by a pivoted forked lever, A^8, that engages with a groove in A^7, and is externally connected with the governor on the engine and with the accelerator-pedal on the car.

Above the casting, A^4, is fitted another casting, A^9, the shape of which is clearly shown. This casting, A^9, receives two pipes, the one fitting into it at A^{10}, conducting the warmed air supply to the carburettor, and the other at A^{11}, being the induction-pipe to the engine. The passage leading to the latter lies centrally above the sleeve, A^6, this sleeve projecting up into it. It will be noticed, therefore, that the valve casting, A^7, when moved upwardly, tends to close the direct passage through A^{11} to the induction-pipe, and that when moved downward it allows a full direct opening to this passage, but then commences to

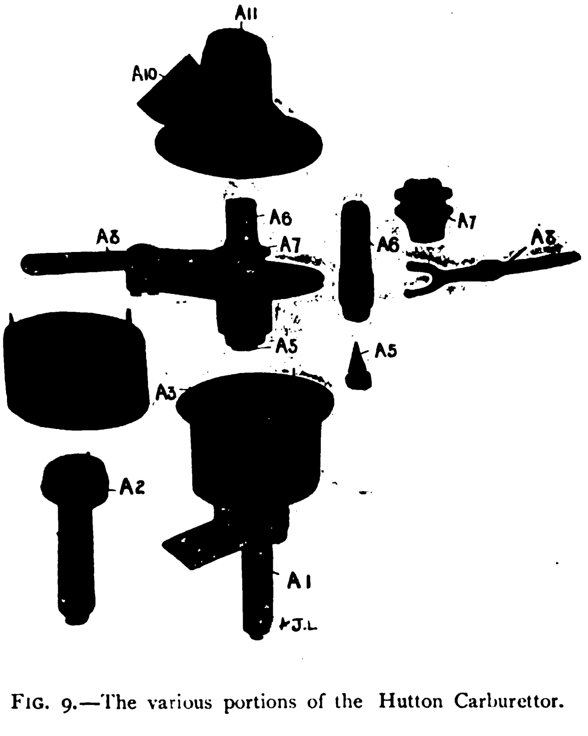


FIG. 9.—The various portions of the Hutton Carburettor.

close the passage leading down between the sleeve, A^{6}, and the casting, A^{4}, to the inside of the sleeve, A^{6}, and to the jet, A^{5}. By moving the valve, A^{7}, therefore, the relative proportion of air which ultimately reaches the induction-pipe, either direct from the passage, A^{10}, to the passage, A^{11}, or less directly past the jet, A^{5}, and up the sleeve, A^{7}, is varied, and since it is only the air which passes the jet that is carburetted, it therefore follows that the richness of the mixture drawn into the cylinders of the engine can be varied by this control. The governor is so connected with the lever, A^{8}, that, as the speed of the engine increases, the tendency is for the valve, A^{7}, to be moved downwards, thus causing the richness of the mixture to be reduced, and finally—if the speed were to increase sufficiently—causing the engine to draw pure air only. It will be seen, too, that when the engine is at rest, the valve, A^{7}, closes the direct communication for the "auxiliary" air, and that therefore, when starting the engine, the necessary extra rich mixture is always obtained.

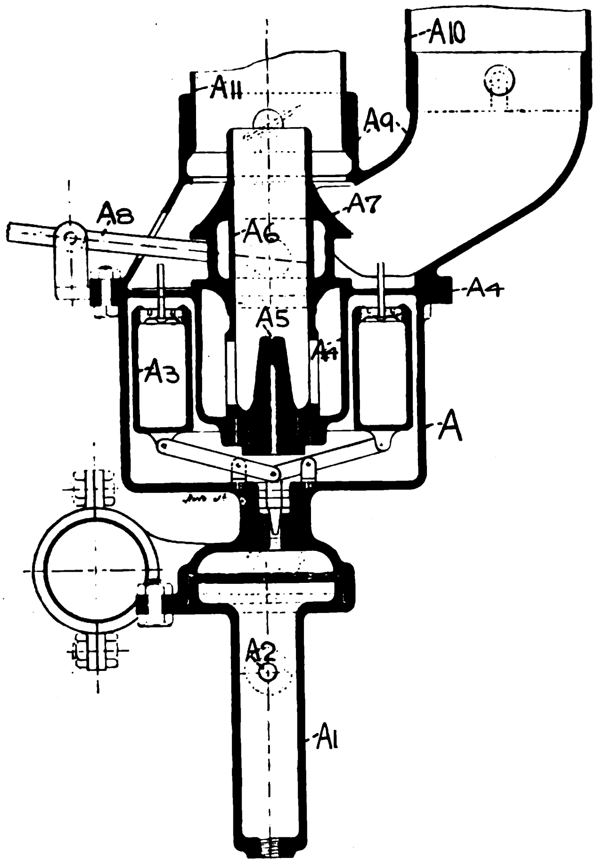


Fig. 10.—Cross-section of the Hutton Carburettor.

It is pointed out, in connection with this carburettor, that by arranging an annular float in this way, the level of the petrol in the float chamber is entirely unaffected by the level of the road surface on which the car may happen to be, whereas with most carburettors the height of the petrol in the chamber tends to vary, either when the car is going up or down hill, or when it is running over roads having a changing cross section.

Another claim made by Mr. Barber is, that a higher fuel efficiency results from the employment of this carburettor, and from the system of controlling the speed of the engine, by varying the richness of the mixture, instead of by throttling—it will be noticed that no throttling of any kind is introduced by the sliding valve, A^{7}.

The Hutton Radiator.

The general construction of this radiator has already been described, and the radiator itself was shown in place on the 20-h.p. chassis in Figs. 1, 2, and 3 last week. The accompanying illustration (Fig. 11), however, enables it to be seen on a larger scale than before, and the manner in which it is put together is rendered particularly clear. Each alternate row of zig-zag tubes is arranged so that the tubes cross one another instead of lying parallel throughout their length, and thus practically the whole of the air which is drawn through it by the fan, has to pass over a considerable area of tube surface. The tubes themselves form the chief mechanical support between the upper and lower plates, into which they are expanded, but light side plates are also bolted between them, and these add considerably to the general finish of this useful radiator. The filler on the top is of very large size and contains a filter. The water is as usual drawn out at the bottom by the pump, and is led back again from the cylinder-jackets to the upper chamber. These chambers, being made in two pieces, can be taken apart at any time, either for cleaning purposes or to insert a new tube, and since the entire cooler is made of aluminium, it is extremely light.

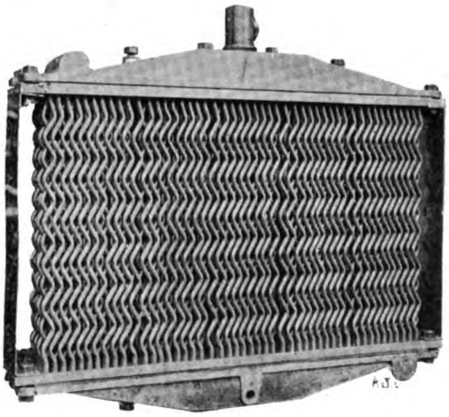


Fig. 11.—View of the Hutton Radiator, which is made of aluminium throughout.

Electrical instruments are proverbially expensive luxuries. The United Motor Industries, however, have now placed on the market a very useful and moderately-priced series of small voltmeters, ammeters, and other accumulator charging accessories, both in pocket form and in neat wood cases for fixing to the dash. Among other accessories included in the series—known as the "F.A."—we notice a very neatly-designed charging board, fitted up complete with the necessary voltmeter, ammeter, resistance lamps, and switches, which should prove of considerable use to those who wish to charge their accumulators from the electric light mains. Another novelty, also introduced from the United Motor Industries, consists of a special grease preparation for applying to terminals in order to protect them from damp.

THE LATEST DE DION-BOUTON PETROL CAR.—PART III.

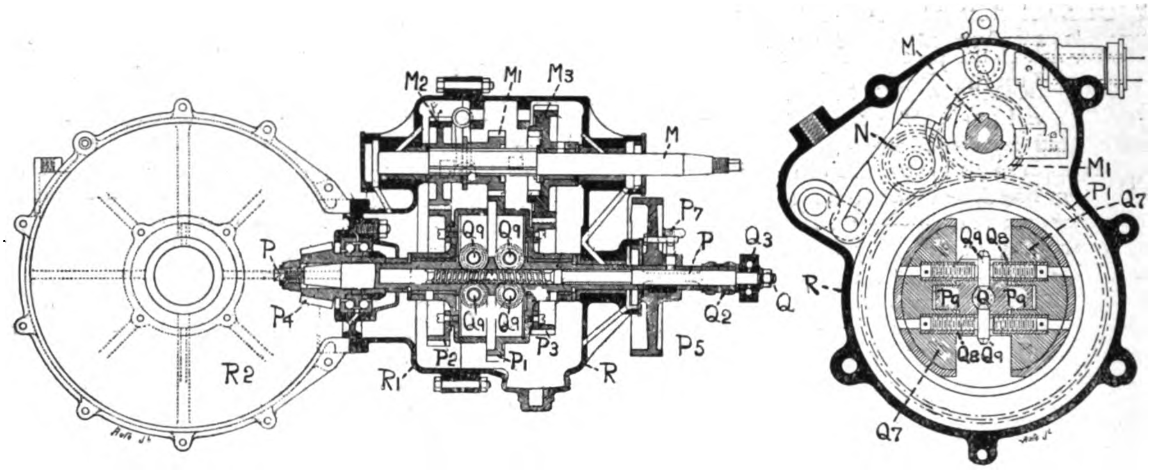


FIG. 16.—Longitudinal and transverse sections of the Change-Speed-Gear on the 10-h.p. De Dion Car.

THE construction of the 10-h.p. change-speed-gear is shown sectionally in Fig. 16, and by photographs in Figs. 17 to 19 inclusive. Fig. 17 shows the two shafts—together with their gear-wheels and the brake-drum, P^5—removed from the gear-box, and with the sliding member in each of its three working positions. Fig. 18 shows the inside of the front portion, R, of the gear-box, and is given in order to enable the arrangement of the small intermediate spur-wheel, N—which gives the "reverse"—to be made clear. The first-motion shaft, M, carries the three spur-wheels, M^1, M^2, and M^3, which respectively give the first, second, and third speeds forward. The wheel, M^1, is free to slide upon three feather keys, and is in fact moved longitudinally along the shaft by the change-speed lever, M^4 (Fig. 13), beside the driver. The wheel, M^2, is securely fixed to the shaft, and the wheel, M^3, is mounted so that it is free to revolve about the shaft on a plain bearing surface provided for it. This wheel, M^3, overhangs its bearing on the inner side, and has an internal gear-wheel formed inside it for the wheel, M^1, to fit into.

The second-motion-shaft, P, is of a peculiar construction, that will be described presently, and it carries the three spur-wheels, P^1, P^2, and P^3, which correspond with the wheels M^1, M^2, and M^3, on the shaft, M. The wheel, P^2, is at all times in mesh with the wheel, M^2, and the wheel, P^3, with the wheel, M^3. The wheel, P^1, is so placed that the wheel, M^1, comes into mesh with it when moved as far as it will go in a rearward direction, and it also lies in such relationship with the intermediate spur-wheel, N, in the gear-box that this wheel, N, can be lowered into mesh both with it and with the wheel, M^1, if the wheel, M^1, is in its central position. The wheels, P^1 and P^3, are fixed rigidly together, and are both solid with a clutch-drum, inside which is arranged an expanding clutch. The wheel, P^2, is also rigid with another clutch-drum, having a second expanding clutch inside it, and each of these external clutch members, together with their gear-wheels, are mounted so as to be normally free to revolve upon the shaft.

By this arrangement, it will be seen that, when neither of the internal clutches is in engagement, no power can be transmitted from the first-motion shaft, M, to the second-motion shaft, P, whatever may be the position of the sliding-spur-wheel, M^1, and it will further be realised that since the two expanding clutches can only be brought into operation alternatively, that when the power is being transmitted through the wheels, M^2, P^2, it is immaterial where the sliding-wheel, M^1, may happen to be at that

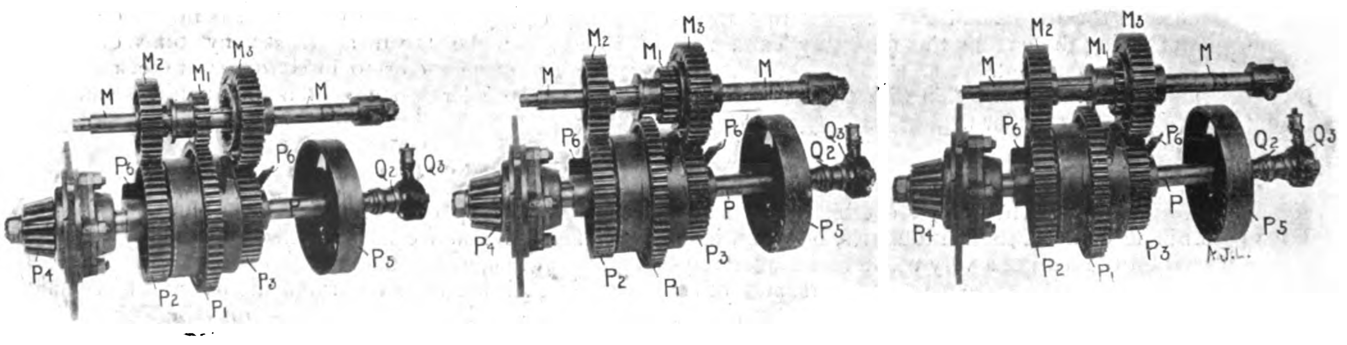


FIG. 17.—Three views of the first and second motion-shafts of the 10-h.p. De Dion Change-Speed-Gear, showing the spur-wheels in their low speed, intermediate, and high speed positions, respectively.

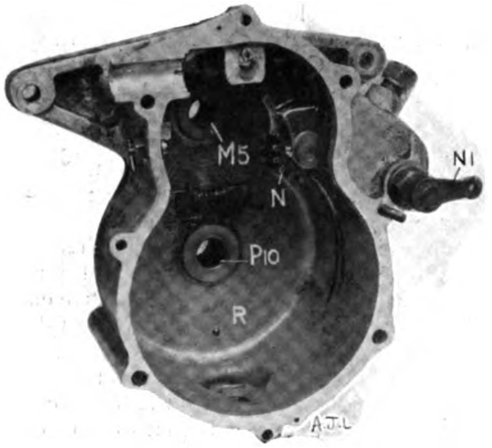


FIG. 18.—Front portion of the 10-h.p. Gear-box, showing the internally-placed intermediate pinion for giving the "reverse."

time. The wheels, M^2 and P^2, give the intermediate speed forward, so that this speed is controlled entirely by one of the expanding clutches, and when it is in use the change-speed-lever at the side of the car may be placed either in the first-speed position, or in the top-speed position, or it may be operated so as to introduce the reverse, without interfering in any way with the drive, but merely in readiness for employment subsequently. These other three speeds (first, third, and reverse) are all primarily controlled by the other expanding clutch—*i.e.*, the clutch lying inside the drum between the wheels, P^1 and P^3. If the wheel, M^1, is brought into mesh with the wheel, P^1, the first speed will be in operation so soon as the expanding clutch renders the wheel, P^1, solid with the shaft, P, and at this time, although the wheels, P^3 and M^3, engage with one another, yet the wheel, M^3, only revolves idly upon its shaft. If, however, the wheel, M^1, is moved forward, by the side lever, as far as it will go, it locks the wheel, M^3, to the shaft, M, and under these circumstances, the power will be transmitted through the wheels, M^3 and P^3, as soon as the expanding clutch causes the wheel, P^3, to be rigid with its shaft. In this position the top speed is in use, the wheel, M^1, is out of mesh with the wheel, P^1, and the wheels, M^2 and P^2, are revolving idly.

When the sliding spur-wheel, M^1, is in its central position it is immaterial whether the forward expanding clutch is in engagement or not, for no power can be transmitted from the one shaft to the other through that clutch until the wheel, M^1, either meshes with the wheel, P^1, or engages with the wheel, M^3. Whilst the wheel, M^1, is in this central position, however, the reverse intermediate pinion, N, can be let down into mesh with the two wheels, M^1 and P^1, and it is, of course, advisable to do this only after the front expanding clutch has been disengaged. This wheel gives the reverse, and is rendered operative by the engagement of the same clutch that is employed for the first and the top (third) speed.

Before describing the actual construction of the second-motion-shaft, P, and its expanding clutches, it might be as well to explain that two hand-levers are employed for operating the change-speed mechanism. One of these is the side-lever, M^4, which can be moved either backwards or forwards from its central position in a quadrant, and its function is that of sliding the spur-wheel, M^1, along the first-motion-shaft, M. The other hand-lever, Q^1, is horizontal, and is fitted on the top of a vertical spindle, which lies, as seen in Fig. 13, close up to the steering-pillar. This lever has no quadrant, but when moved forwards or backwards from its neutral position, it causes one or other of the two expanding clutches to engage with its drum;

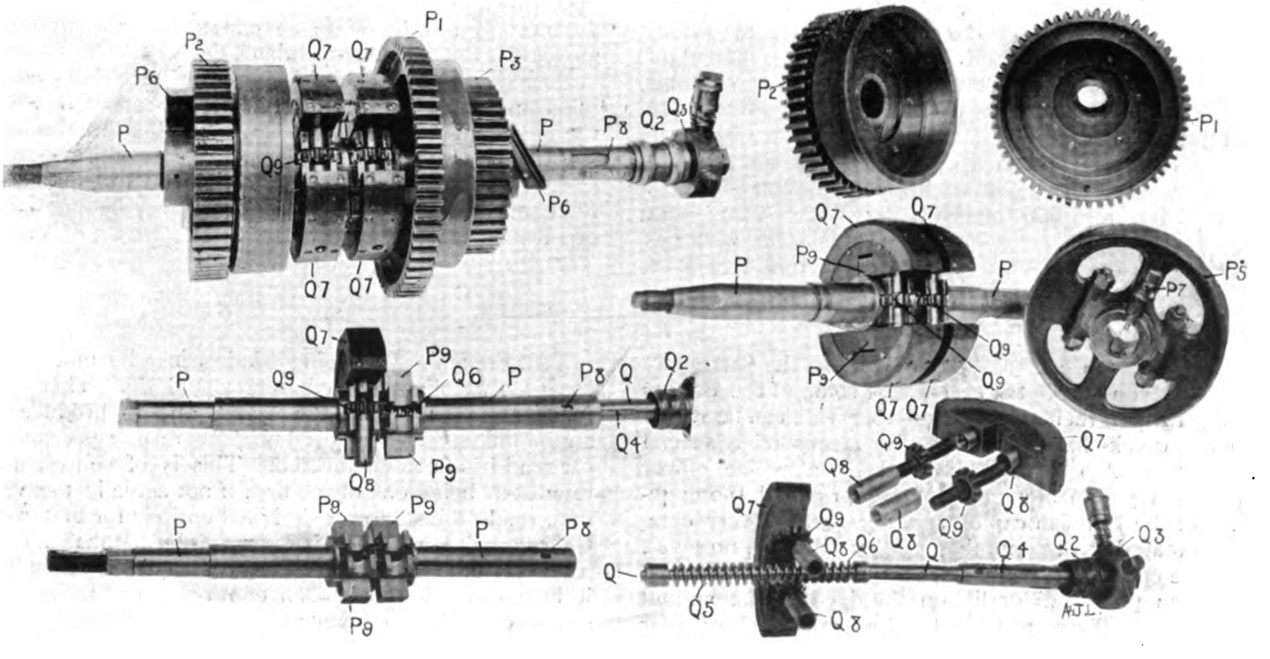


FIG. 19.—Views of the second-motion-shaft, at different stages of erection, showing the construction and method of operation of the Expanding Clutches

when moved in the one direction it at all times introduces the second speed forward, no matter where the lever, M^4, may be placed; when in its central position no power can be transmitted from the engine to the road wheels under any circumstances; when moved in the other direction it brings into play either the first, the third, or the "reverse" speeds, according to the position of the change-speed-lever, M^4. The "reverse" gear is arranged in a very ingenious manner, the small intermediate pinion, N, being let down into mesh with the wheels, M^1 and P^1, in the gear-box by throwing over the hinged handle, N^2, of the change-speed-lever itself. The handle is normally locked in its vertical position by a spring catch, and it can only be hinged over at all—even if the catch is released—when the gear-lever, M^4, is in its central position in the quadrant. This is provided for by fitting a catch on the sliding-rod, N^3, just beneath the quadrant, and only at the neutral point is there a slot for it to pass through the quadrant. The catch on the lever and the slot in the quadrant not only prevent the "reverse" from being introduced except when the change-speed-lever is in its neutral position, but they also prevent that lever from being moved from its neutral position whilst the intermediate gear-wheel, N, is in mesh. It is, therefore, absolutely impossible for the most careless driver to bring two speeds into gear at the same time, and the worst that he can do is to change from the first to the third speeds without disengaging their common clutch, or, under other circumstances, to make the change from the reverse to the second-speed-forward with unintentional suddenness.

Reference to Fig. 19 will enable a clear comprehension of the construction of the second-motion-shaft, P, and of its very ingenious and adjustable expanding clutches to be obtained. In the first view this shaft has had the bevel wheel, P^4, and the ball thrust-bearing immediately behind this wheel removed from its rear end, and it has also had the brake-drum, P^8 (which lies outside the gear-box), taken off its other end. The clutch drums, too, with their spur-wheels, have been slid sufficiently along the shaft to expose the expanding clutches to view. In another view the clutch drums have been taken off completely to show the whole of the expanding clutches intact. In the other views the shaft is first seen with the clutches partly dismantled, and is then shown with these clutches taken entirely to pieces, and with the internal sliding shaft, Q, drawn right out from the hollow shaft, P. It will be noticed that the shaft, P, is hollow throughout the greater part of its length, that it is solid where it receives the pinion, P^4, at its rear end, and that it is curiously shaped and slotted centrally. It has four projections, P^9, which serve as guides for the expanding clutch members, Q^7, to slide in and out upon, and cause these members to revolve with the shaft. It is also slotted right through at right angles to the projections, P^9, the slots passing through other projections which form cradles for small sleeves, Q^8, to lie in. The expanding members, Q^7, have fibre friction surfaces around them where they press against the inner face of the clutch drums, and each pair of these clutch members are connected together by two small screwed pins having left and right-hand threads at their respective ends. The screwed pins are provided with pinions, Q^9, at their centres, and the sockets, Q^8, into which they screw not only lie in the cradles already referred to, but project into and are rigidly pinned to the clutch members, Q^7. It will be understood that each expanding clutch has two friction shoes, Q^7, which are only connected together by the left and right-hand threaded screws fitting into the sockets, Q^8. The one end of the one screw is a right-hand thread, and the end of the other screw, which fits into the same shoe, has a left-hand thread, whilst no screw has a same handed thread at both ends. The shoes can only move towards one another (or away from one another) radially, because of the guide projections, P^9, and they cannot move longitudinally along the shaft, because the sleeves, Q^8, are held by the cradles. If one of the pinions, Q^9, is turned about its axis in the one direction of rotation, and the other pinion in the other direction, the two shoes will be forced away from one another (and will remain parallel) by both screws, and if the pinions are turned in the opposite direction it, of course, follows that the two shoes will be drawn in towards one another. The pinions, Q^9, project down into the slots in the shaft, P, already referred to, and here they both engage with screw threads on an internal shaft, Q. The screw threads on the shaft, Q, may for the moment be considered merely to form a toothed rack, which when slid longitudinally in one direction or the other gives a rotary motion to the pinions, Q^9, and, therefore, an expanding or contracting movement to the clutch-members, Q^7.

Both the expanding clutches are constructed in exactly the same way, except that the small feed-screws, of which the pinions, Q^9, form a part, have left-hand threads substituted for right-hand threads, and *vice versa* throughout, so that when the inner shaft, Q, is moved longitudinally the converse effect is produced on the two clutches—the one expands and the other contracts.

(*To be concluded.*)

Motor cars are numbered in Berlin in the same way as in this country, but it seems that some of the owners have provided their cars with numbers that can be varied on the quick-change principle by means of a special apparatus. A car was observed by a police officer approaching him along one of the principal thoroughfares of the Prussian capital recently, and he very carefully noted down the number. It was proved, however, that the car to which the number really belonged had not been present in Berlin on the day in question, and the police officer produced witnesses to show that trickery of this kind was by no means uncommon. We conclude that when the tricksters are caught they will be made examples of.

The French are civilising Madagascar by motor car, as we always anticipated they would do. There are practically no roads in the island, and to produce an automobile service for postal purposes an extensive motor car road has been engineered. This is of considerable interest as being one of the first, if not actually the very first, road projected and designed entirely for motor car traffic. The road, which runs from Mahatsara to Tananarive, is of considerable extent, and the difficulties in its construction have been enormous, involving deep cuttings and high embankments, curves, and gradients which have taxed the resources of the engineers to the utmost, but there are few better road makers in the world than the French, and the constructors of this road have successfully surmounted all difficulties.

THE 15—20-H.P. BROOKE PETROL CAR.—PART II.

THE combined governor and carburettor employed upon this vehicle is shown in Figs. 9 and 10, the former illustration being reproduced from a photograph, and the latter being a longitudinal cross-section. The carburettor is fixed on the right side of the engine, as shown in Fig. 5, and the main air supply is led to it by a pipe passing across between the cylinder castings from the neighbourhood of the exhaust pipe.

The carburettor proper is of much the usual float-feed type, and is rendered automatic—in order to enable it to maintain a constant richness of mixture—by providing it with a spring-loaded air-valve, which tends to prevent any considerable increase in the degree of vacuum that is formed in the mixing chamber at any time. The float-feed chamber, A, communicates with the spray jet, B, as in most carburettors, and a combined mixing cone and inspection plug, C, is screwed into the mixing chamber immediately above the jet. The warmed main air supply enters through the pipe fitting, F, and cold air can also be drawn in to a greater or less extent through the valve, D^1, in the casting, D. The whole of the air then passes around the jet, and it can then normally find its way to the induction pipe, E, through the hollow throttle-valve piston, G. The valve, D^1, is normally held on its seat by a light spring, the strength of which can be adjusted by the feed-screw, D^2. When the engine is running very slowly, or is only being started, the whole of the air drawn by the engine enters the mixing chamber through the pipe-fitting, F, the size of which is so proportioned that sufficient petrol is then drawn up through the jet to give a rich enough mixture. When the engine speed is higher a greater degree of vacuum would naturally be formed in the mixing chamber, and too much petrol would flow through the jet. The valve, D, however, then automatically opens, and the mixture is thus prevented from becoming too rich.

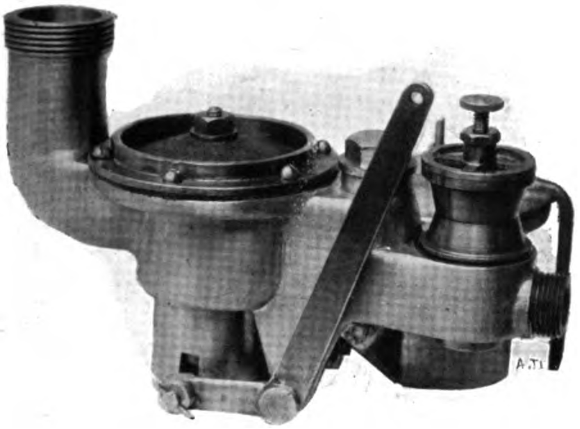


FIG. 9.—View of the Brooke Combined Automatic Carburettor and Automatic Governor.

The piston, G, which acts as a throttle valve between the carburettor and the engine, is normally held open, as seen in Fig. 10, by a spiral spring lying beneath it. A second, hand-controlled, piston, H, is fitted into the lower portion of the same cylinder, and it is on this second piston that the spring rests. The piston, H, is connected with the lower of the two small hand levers above the steering wheel on the car, by a system of levers of which H^1 and H^2 form a part, as seen in Fig. 5. The driver is by this means able to regulate the pressure of the spring lying between the pistons, H and G, and normally tending, as we have seen, to hold the throttle valve full open. The piston, G, is fixed securely to a diaphragm, J, which lies above it, and this diaphragm constitutes a portion of the wall of the induction pipe between the throttle valve and the engine. Whenever the suction in the induction pipe increases, the tendency is for the diaphragm, J, to be pressed downward by the atmospheric pressure on its external surface, and the tendency, therefore, is for the piston, G, to slide downwards, cutting off the feed from the carburettor to the engine. The diaphragm, J, together with the piston, G, therefore, acts as an automatic governor, and tends to maintain a constant engine speed because the degree of vacuum in the induction pipe increases as the engine runs faster. The normal speed of the engine depends upon the position of the lower piston, H, and can therefore be adjusted from the driver's seat.

The main-clutch is of the internal cone type, and is as usual fitted into the rim of the flywheel in such a way that the spring is self-enclosed. The flywheel spokes are so cast as to form a very effective fan to assist the belt-driven fan in drawing air through the radiator. The clutch-shaft is connected with the change-speed-gear by a very neat universal joint (visible in Fig. 1), the two halves of which have their forked arms set at right angles to one another, and are connected together by a thin steel plate. The plate is X-shaped and gives the necessary flexibility between the shafts.

The outward appearance of the gear-box is well shown in Fig. 1, and the details of its construction are seen in the horizontal section, Fig. 11. The short shaft, K, which is connected with the clutch by the universal joint, already described, carries the bevel-wheel, K^1, at its rear end inside the gear-box, and this meshes with a corresponding bevel, L^5, on the first-motion-shaft, L. The box itself is made in two pieces so that the two parts form the upper and lower halves of all the bearings. The second-motion-shaft is also the differential-counter-

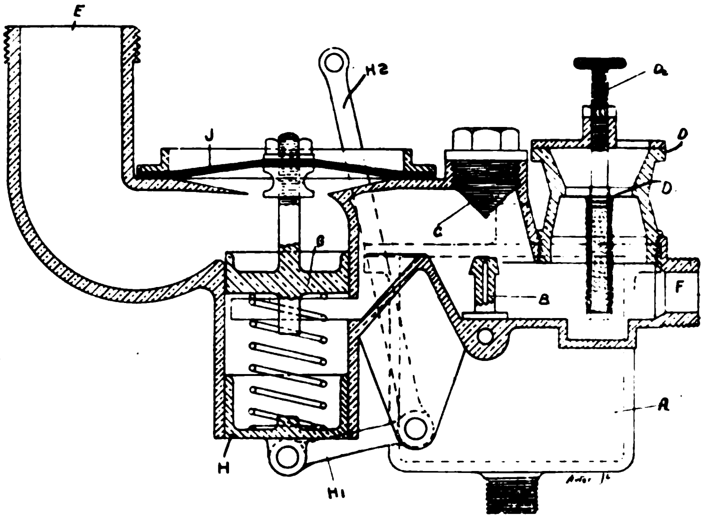


FIG. 10.—Vertical section of the Brooke Governing Carburettor.

shaft, and its differential ends pass through separate castings that are bolted on either side of the main box. The entire gear is fixed to the chassis at three points only—to the longitudinal members of the main frame, immediately above the countershaft, and to the transverse member of the frame centrally. Mounted upon the first-motion-shaft, L, are three sprocket-wheels, L^1, L^2 and L^3, and a spur-wheel, L^4. The wheels L^1 and L^4 are fixed securely to the shaft, but the other two wheels ride freely upon it. Sliding jaw-clutch members, L^6 and L^7, are also carried upon squares formed on the shaft, and it is by these jaw-clutches that either of the wheels, L^2 or L^3, can be rendered rigid with it; these two jaw-clutches are controlled by forks projecting from a sliding-rod, N^3. The countershaft has the differential-gear, M^5, arranged centrally, and to its shell are firmly fixed the sprocket-wheels, M^2 and M^3, from which chains pass to the wheels, L^2 and L^3, respectively. The sprocket-wheel, M^1, and the spur-wheel, M^4, are also mounted upon the sleeve of the differential shell, but the sprocket, M^1, is normally free to revolve upon it, and a jaw-clutch, M^6, is fitted in connection with it. A third chain connects together the two sprockets, L^1 and M^1, and the jaw-clutch, M^6, is controlled by a fork projecting from a second sliding-rod, N^2. The spur-wheel, M^4, as also the brake-drum, M^7, are both securely fixed to the shell of the differential, and there are a pair of intermeshing intermediate spur-wheels, P, arranged so that they can be slid into engagement with the wheels, L^4 and M^4. The first speed is obtained by causing the jaw-clutch, M^6, to come into engagement, the power then being transmitted through the chain from the wheel, L^1, to the wheel, M^1. The second speed is introduced by the jaw-clutch, L^6, the wheel, L^2, then driving the wheel, M^2, by their chain. The third speed is brought into use by the jaw-clutch, L^7, the differential-gear being then driven by the chain connecting the wheel, L^3, with the wheel, M^3. The reverse-gear results from the introduction of the two intermediate spur-wheels, P, between the wheels, L^4 and M^4, and these are slid into engagement by a fork projecting from the sliding-rod, N^2.

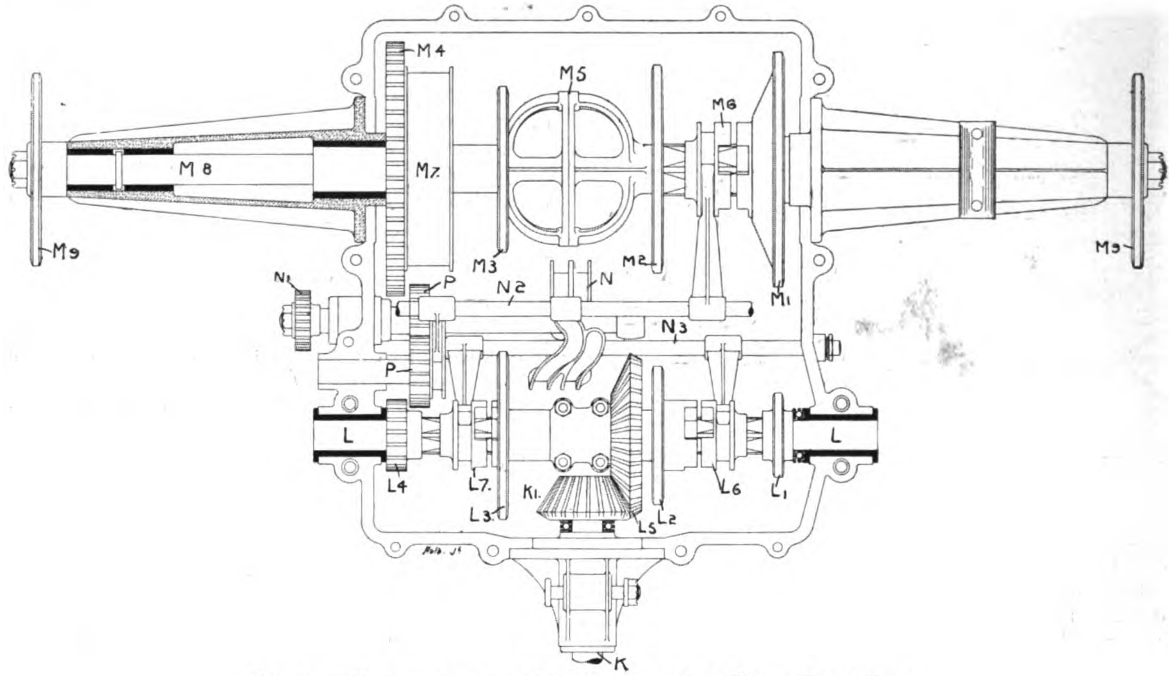


FIG. 11.—Horizontal section of the Brooke 20-h.p. Change-Speed-Gear.

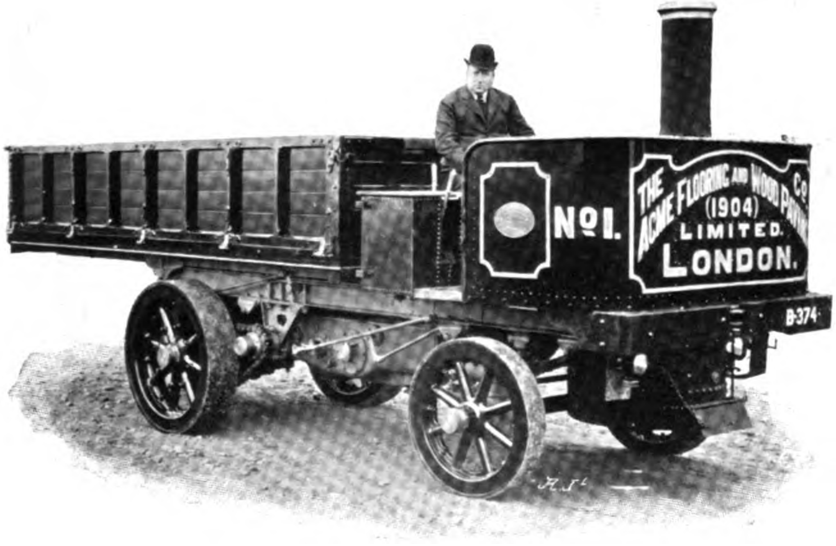
One of the intermediate wheels, P, is mounted on a short stationary pin, and the other rides upon the shaft, upon the outer end of which carries the spur-wheel, N^1, seen (outside the gear-box) in Fig. 11. It is by this shaft that the change-speed-gear is operated, the wheel, N^1, being engaged by a toothed quadrant which is fixed to the change-speed-lever, beside the driver. Inside the gear-box, the shaft carries a specially shaped cam, N, the grooves in which engage with pins projecting on the two sliding rods, N^2 and N^3. The shape of the cam grooves is such that the various gears are introduced consecutively. The hand lever on the side of the car is so arranged that it is drawn back towards the driver—instead of being pushed forward—to introduce the higher gears. The quadrant is so notched that the lever can be pushed forward without disengaging the catch, but that the catch holds it in either working position, and prevents it from being drawn backward until withdrawn. The two differential shafts, M^8, and the short driving shaft, K, are provided with ring-lubricated bearings, and it will be noticed that plain bearings are used throughout, although ball thrust bearings are introduced behind the bevel, K^1 and L^5. The power is transmitted from this change speed-gear to the rear wheels by side chains from the sprockets, M^9.

One of the unusual features of this vehicle is the arrangement of the foot-operated brake inside the gear-box. This brake is of a very powerful character, and has cast-iron shoes pressing against the cast-steel drum, M^7. The friction surfaces are carefully ground together, and, of course, the brake always runs in oil. The pedal which operates it is of the "push" form, as seen in Fig. 1, where it will be noticed, too, that the clutch-pedal to the left of it is of the same shape. The side brakes, acting direct on the hubs of the rear wheels, are of the band type and have radius thrust-rods passing forwards up to the frame.

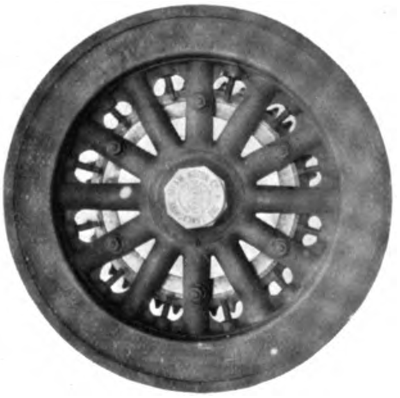
The vehicle should prove thoroughly satisfactory for general all round and touring purposes, for it is of strong construction and is made of good materials throughout.

MESSRS. CORDINGLEY & CO.'S AGRICULTURAL HALL SHOW.

AMONGST the heavy steam lurries, one of the new features was the use of composite steel and wood driving wheels. In those fitted to the Lancashire Steam Motor Company's lurries, the hub and spokes are made in one piece, and in such a way that the wooden felloe fits around this casting, and is secured by studs passing through it, as seen in our illustration. A thick wooden felloe is thus introduced between the inner casting and the outside rim, the felloe giving a considerable amount of flexibility to the wheel. Other improvements which have been made by this company on their lurries include the arrangement of the feed-pump, so that it is driven off the crank-shaft, instead of the countershaft, with the result that the quantity of water that can be delivered to the boiler varies with the speed of the engine instead of with that of the car. Ample water is therefore available when climbing a steep hill on the top gear, and the pump can also be used when the wagon is standing still. The steering-gear, too, is now enclosed in an oil-tight casing, and expanding brakes, having very large shoes, are fitted to the driving wheels.



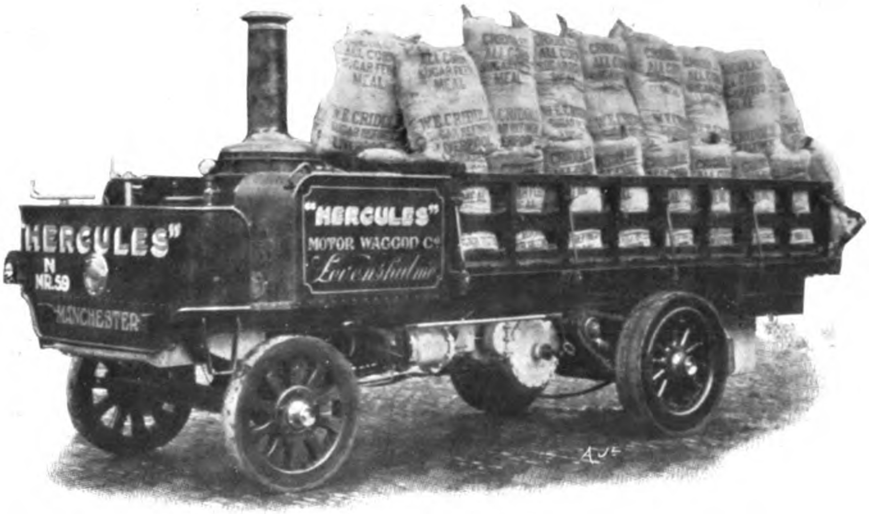
One of the Lancashire Steam Motor Company's 8-ton Lurries fitted with their special composite (steel and wood) wheels.



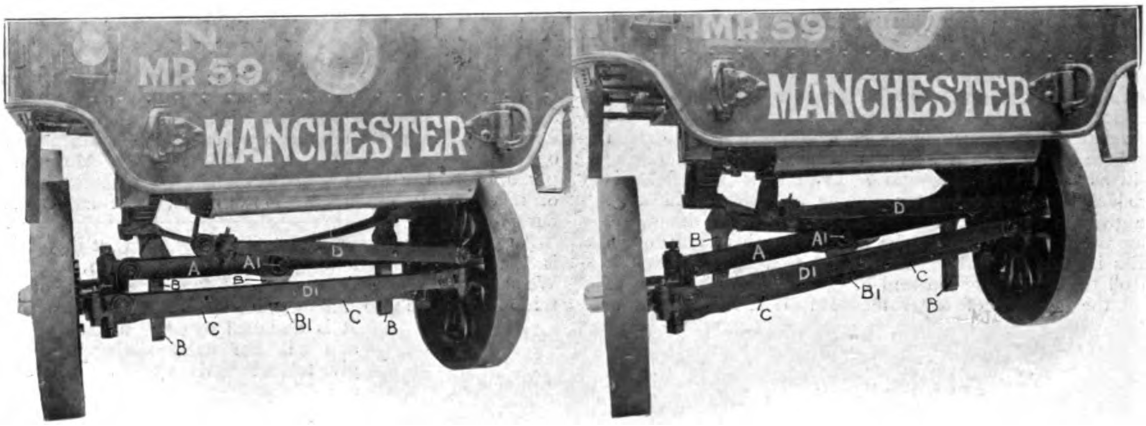
The Lancashire Steam Motor Company's Composite Wheel.

Another composite wheel was shown on the Hercules steam wagon, and its construction differs somewhat from the Lancashire Company's wheel. In this case, the casting forms a rim having a channel cross-section, so that the felloe is to a great extent, held in place by its flanged edges, and it is chiefly the steel tyres that are fixed by the bolts that pass through the felloe. These wagons are made by the Hercules Wagon Company, of Levenshulme, and have many novel and interesting features. They are of extremely strong construction, the rear wheels are driven by side chains, the whole of the driving mechanism is completely enclosed, and the front axle is so constructed that all four wheels can remain in contact with the road—however rough or uneven its surface—without imposing undue strains upon the frame or the machinery. The front axle is shown both in a horizontal position and also tipped up to a considerable extent in one of the accompanying illustrations, where it will be noticed that an ingenious parallel motion allows for the necessary rocking action, and at the same time prevents the wheels from assuming other than a vertical position. The axle consists of a pair of strong bars, A, and another pair of similar bars, C. These are both pivoted centrally (at A^1 and B^1 respectively) to a forging, B, which is attached to the main frame by the side springs, and also forms guides to keep the bars, A and C, at right angles to the main frame. The bars, A and C, are fulcrumed at both ends to the steering-heads, and the steering-gear is of the Ackerman type, operated by the link, D, and the cross-tie, D^1. Space does not permit of a fuller description of the many other interesting features of this new wagon, but we hope to refer to it again shortly in our columns.

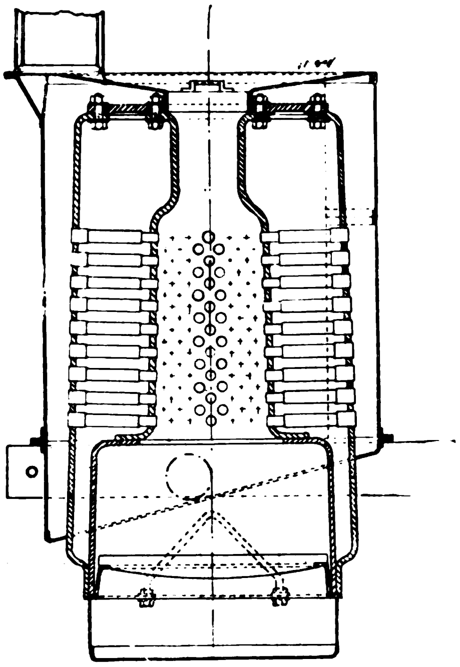
Another steam wagon, shown for the first time at this Exhibition, is that manufactured by J. Robertson and Son, of Fleetwood. We show the general appearance of this wagon in one of our illustrations this week, together with a sectional drawing of the boiler. It is designed to carry a load of five tons, and has the usual sliding spur-wheels to give two alternative speeds. The rear wheels are driven by side chains, and the engine and the gearing is completely enclosed. The front suspension is by means of a transverse-inverted spring, and the axle is carried in horn plates at each end, giving a three-point suspension. The steering is on the Ackerman principle, and the front axle itself is a mild steel forging. The side-springs above the back axle slide at each end in shoes, having hard brass liners, on the frame ; the axle itself is built up of a strong girder, having an H cross-section, to the ends of which are securely fixed strong forgings for carrying the wheels and the springs. The engine is of the horizontal compound type, and its crank-shaft is a solid forging, of which the eccentric blocks form a part. The cylinders are 4 ins. and 7 ins. in bore, and the stroke is



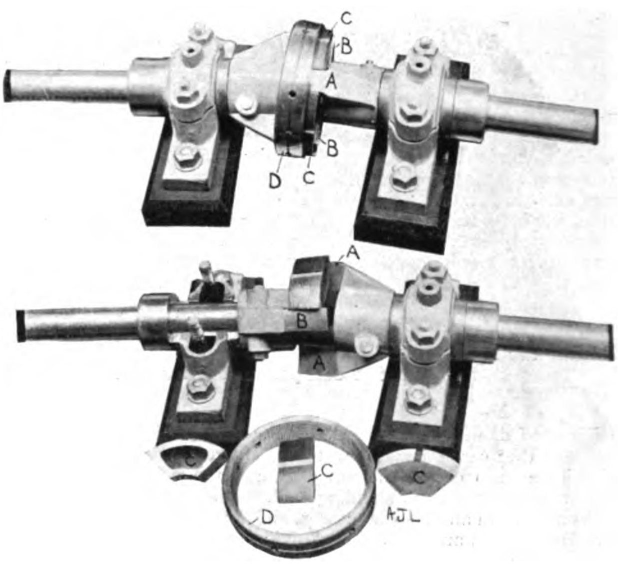
The 5-ton Hercules Steam Wagon, fitted with composite (steel and wood) wheels.



Two views of the front axle of the Hercules Steam Wagon, showing the parallel motion mechanism that comes into play on rough roads, preventing any straining of the frame.



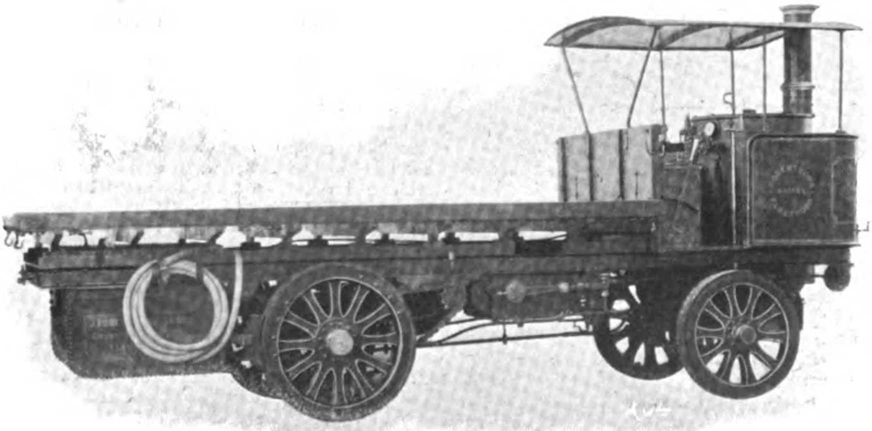
Vertical section of the special, central-fired, multi-tubular, fire-tube, boiler which is fitted to the Robertson Steam Wagon.



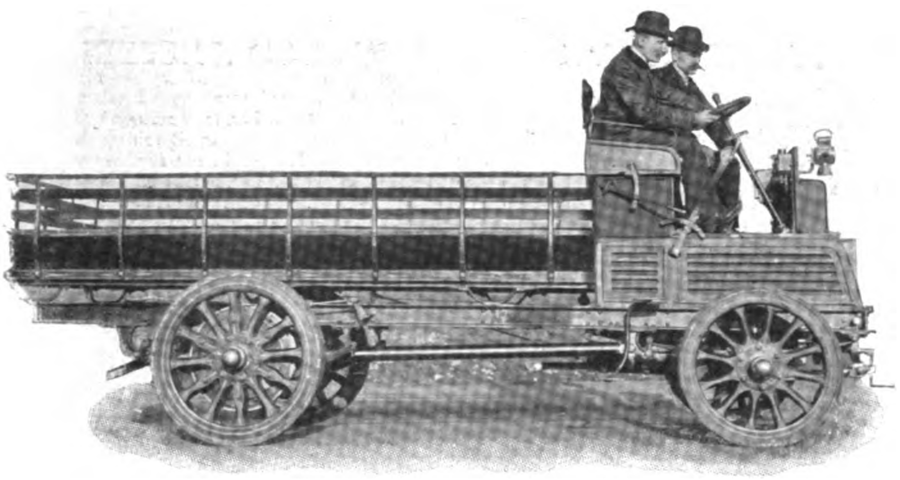
The Newman Adjustable Universal Joint.

5 ins. The construction of the boiler is well shown in our drawing; it is of a special multi-tubular fire-tube type, and is fired centrally from the top. All the tubes are completely covered by the water, and they lie radially between the fire-box and the outer shell. The tubes, too, are readily accessible for cleaning, as the outer casing can be easily removed. The fire-bars, with the ash-pan, are suspended beneath the boiler in such a way that they can be raised or lowered by a neat gear mechanism fitted in front of the wagon. A large feed-water heater is supplied, and any condensed exhaust steam from it is filtered and returned to the large 190-gallon water-tank at the back. The side-brakes are of the expanding type. An auxiliary steam-pump is fitted beneath the foot-board.

In the Howard steam lurry, of which one of their five-ton standard models was shown, the frame is supported on four semi-elliptic side-springs, and an Ackerman system of steering is employed. Both axles are straight, and have a square cross-section. A peculiar feature of the suspension is that the front



The Robertson 5-ton Steam Lurry.



The Brillie Petrol Lurry, shown by the Motor Car Emporium, Limited.

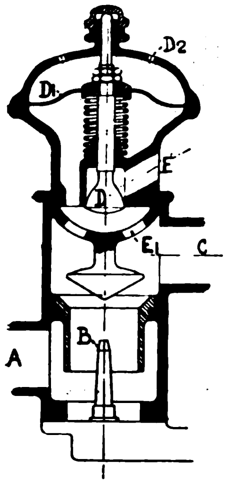
springs are carried by a cross-beam which is pivoted centrally to the frame, so as to allow of sufficient rocking motion to avoid side-strains being imposed by rough roads. Metal wheels with interlacing spokes are fitted, the rear wheels are driven by side-chains, and the gearing is exposed.

Comparatively little change was noticeable on the steam wagons shown by the Mann Steam Wagon Company, by Savage Brothers, and by the Yorkshire Steam Wagon Company, since we last described their vehicles, and Messrs Foden's, Limited, had on view samples both of their tip wagon and of their lurry. The front axle on the Mann wagon is pivoted centrally beneath a turntable, and has a large flat leaf-spring arranged beneath it.

Amongst the heavy vehicles driven by petrol engines, the Brillié lurry exhibited by the Motor Car Emporium, Limited, and the Orion lurry, which, although not in the catalogue, was entered after the exhibition was opened, are both new to the majority of our readers. The special features of the former vehicle—which is capable of carrying a load of 2½ tons at speeds up to eleven miles per hour—are that the differential countershaft is carried by large tubular radius-rods passing from the back-axle forward to the channel steel frame, that this countershaft is mounted in eccentric bearings by which it can be moved bodily (to a certain extent) forward or backward, and that the rear springs pass beneath the axle instead of being fixed above it. The vehicle is carried on very long semi-elliptic side-springs, and those at the back have shackles at the rear end, and curiously-shaped flexible connections at their front ends. The engine and the gear-box are mounted close together, in front, with an internal cone-clutch between them. The engine has two cylinders, with mechanically - operated inlet - valves above the exhaust-valves, and develops 10 to 14-h.p. The change-speed-gear gives a direct-through-drive on the top speed, and its lay-shaft is mounted above the through-shaft. The power is transmitted from the gear-box to the differential countershaft by a propeller-shaft, and the ends of the differential - shaft carry spur-wheels, which mesh with internal gear-rings fixed to the rear-wheels. The object of the eccentric bearings for the countershaft is to permit different-sized spur-wheels being fitted to it, and thus to permit the lurry being geared higher or lower according to requirements. The brake-bands, which act upon the drums fixed to the back wheels, are constructed of steel cable. An automatic carburettor, having a spring-loaded auxiliary air-valve, is used, and this is exhaust-jacketed to render it suitable for utilising heavier grades of fuel than petrol.

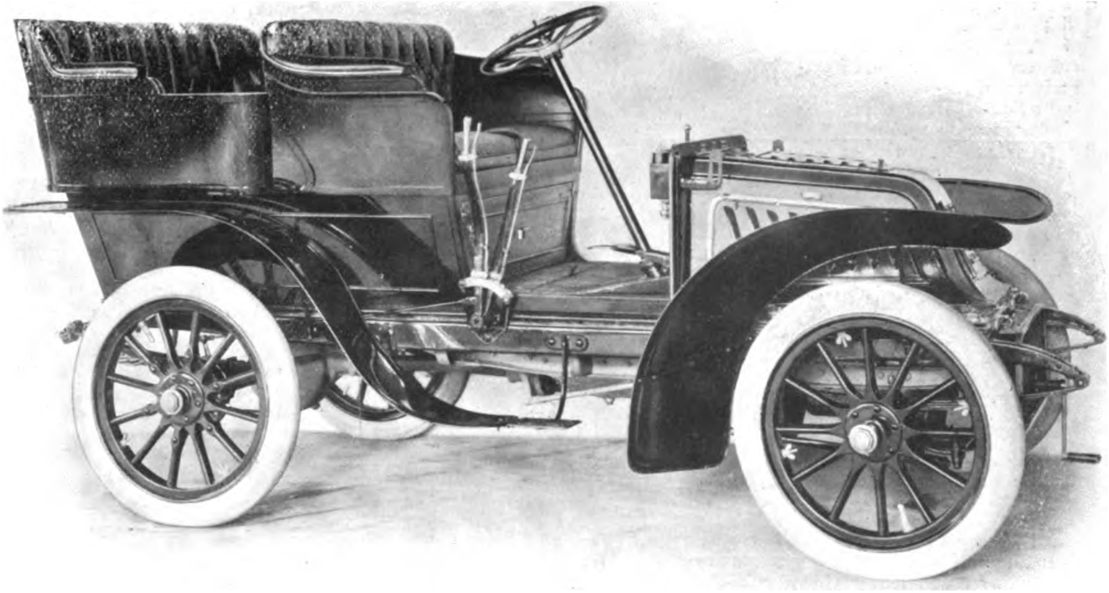
The "Orion" lurry has a single-cylinder engine, and had, previous to its arrival at the Show, been working for a fortnight carrying coal in the London district; we understand that during ten days it carried to its destination no less than 104 tons. One of these vehicles, which are made in Switzerland and are apparently first-rate hill climbers, was shown making the ascent of the Uetliberg in our issue of January 23rd last.

The heavy petrol vehicles shown by the Stirlings Motor Construction Company, took the form of a 'bus, although they are making lurries in which the chassis is of identical construction. The twin-cylinder engine is placed beneath the floor in front of the driver, and the gear-box lies just behind it. The propeller-shaft, by which the power is transmitted to a differential countershaft—carried on a sort of reach-rod frame—lies considerably to the left of the centre of the vehicle, and the ends of the countershaft are fitted with pinions, which mesh with large spur-wheels fixed to the driving wheels. The radius-rods carrying the countershaft pass from the ends of the back axle and meet together in front, where they are joined by a flexible connection to the centre of a cross-member of the main-frame The front-springs are semi-elliptic, the rear-springs full-elliptic, and the wheels are shod with solid rubber tyres.



Section of the Wilkinson Carburettor (described on page 376). A, Main air inlet; B, Spray jet; C, Induction pipe; D, Spring-loaded auxiliary air-valve; D^1, Diaphragm fixed to auxiliary air-valve; D^2, Communicating holes between atmosphere and the chamber above the diaphragm; E, Auxiliary air - inlet; E^1, Passage for auxiliary air through mixing cone casting.

The "Orion" Petrol Lurry carrying a load of coal, as shown at the Exhibition.

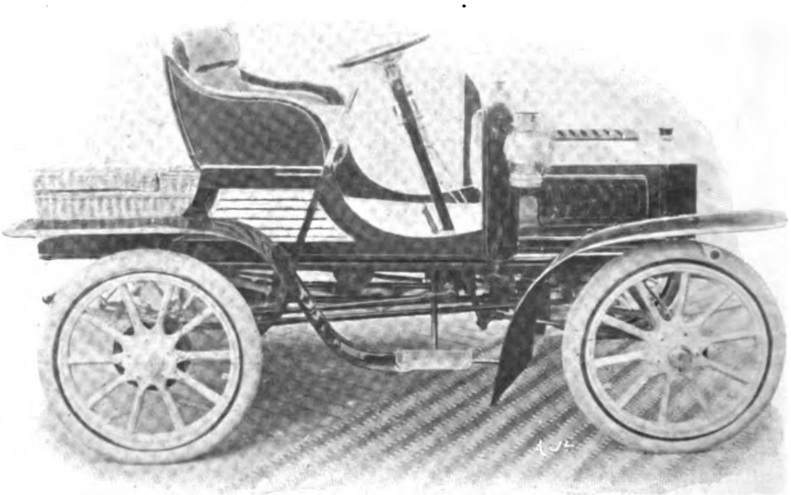


An 11-h.p. Twin-Cylinder Talbot Car fitted with standard tonneau body.

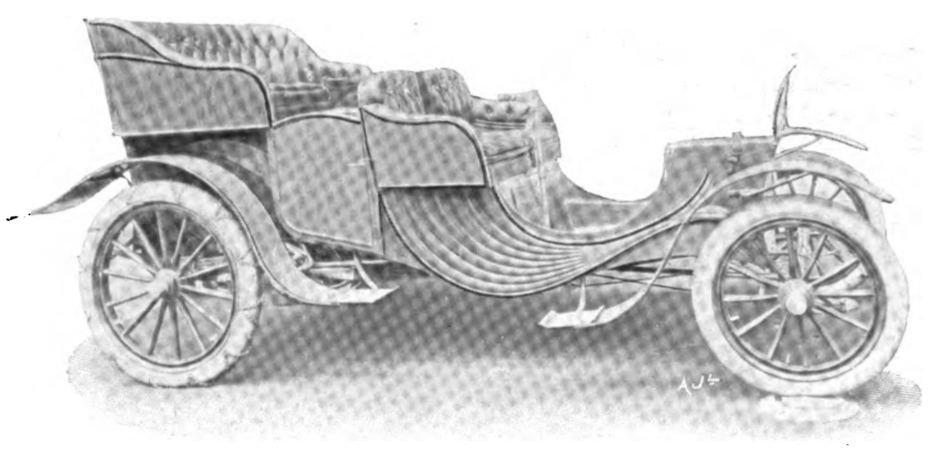
The Cadogan petrol lurry, which was illustrated by us on March 5th last, and was again shown at this exhibition, is of peculiar construction in many respects. The channel main-frame in front does not continue back beyond the gear-box, which lies in the usual position behind the engine. There is, however, a kind of channel under-frame passing on each side of the gear-box from a curved cross-member that carries the ends of the differential countershaft, and it is fixed to the frame in front, in the neighbourhood of the flywheel; the U-shaped cross-member, that carries the ends of the countershaft, is secured to the lurry at both sides. The semi-elliptic side-springs have very little camber, and those in front are attached to their brackets, at both ends, by pins that pass through the brackets, and have rubber cushions introduced between them on the under side of the brackets. The engine, which is fixed very low down to U-shaped brackets passing across beneath it, is of the two-cylinder (four-piston) Gobron-Brillié type, and is capable of developing 34-b.h.p. It lies close up forward, and is beneath the floor in front of the driver's seat. The main clutch is placed at some distance from the flywheel, and is of comparatively small size. Each of the rear wheels is driven by a side chain.

The Hagen lurry, which was on view, and in which this firm's well-known gradually-variable change-speed mechanism is used, is fitted with a 4-cylinder petrol engine, and is of very much stronger construction than the earlier lurries made by the firm. The arrangement of the mechanism, however, is the same, and the one-way clutches by which the back axle is driven are mounted direct upon that axle.

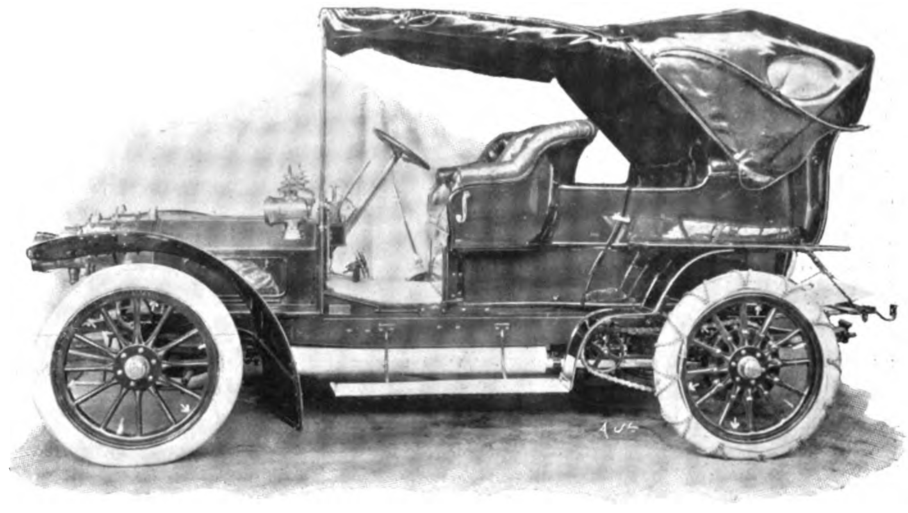
Quite a number of petrol engines for launch work were shown by different makers, the stand of Mr. F. C. Blake, in particular, being very complete in this respect. On his stall, too, was shown a specially-constructed engine which he has made for the Utile Motor Manufacturing Company for a very simple form of voiturette that has been developed by them. No gear-box is employed on their little car, but the engine is, instead, made with an extra large half-speed cam-shaft, so that the whole of the power can be transmitted through it. An intermediate spur-wheel is introduced between the crank-shaft and the cam-shaft so that both these shafts run in the same direction. Both shafts have friction clutch members fitted at their rear ends, and another clutch member, which corresponds with both of these, is mounted on the forward end of a short shaft from which a universally-jointed propeller-shaft is led to the live rear axle. The short clutch-shaft is carried by a pivoted bracket in such a way that the clutch can be withdrawn by sliding it endwise, and that it can then be swung over so as to come in line with either the crank-shaft or the cam-shaft. Two forward speeds are in this way obtained, and on the high-gear there is a direct drive from the crank-shaft to the bevel-wheel driving the axle. In this very simple manner, all that is necessary in the way of speed-reduction-gear for a light vehicle is secured, and in addition to this, the mechanism is in every sense self-aligning, and the transmission losses under ordinary conditions is reduced to a minimum. Even when the propeller-shaft is being driven by the cam-shaft, the former shaft lies at but a small angle from the straight, owing to its great relative length. A single central radius-rod, which is fixed to the casing enclosing the live axle, is hinged at its forward end to the car just above the clutch-shaft, and this radius-



The "Horbick Minor."—This light car is shown by Messrs. Horsfall and Bickham. It differs largely from their larger "Horbick" Cars. A single-cylinder vertical engine is placed in front and drives a propeller shaft which passes to the back axle. By an arrangement of skew-bevels, on the live axle, two speeds and a reverse are obtained. Free-wheel clutches take the place of the differential, and these are locked for the reverse.



A 15-h.p. Duryea Standard Tonneau with side door. A description of the latest Duryea Cars appeared in our issue of November 28th, 1903 (p. 1272).

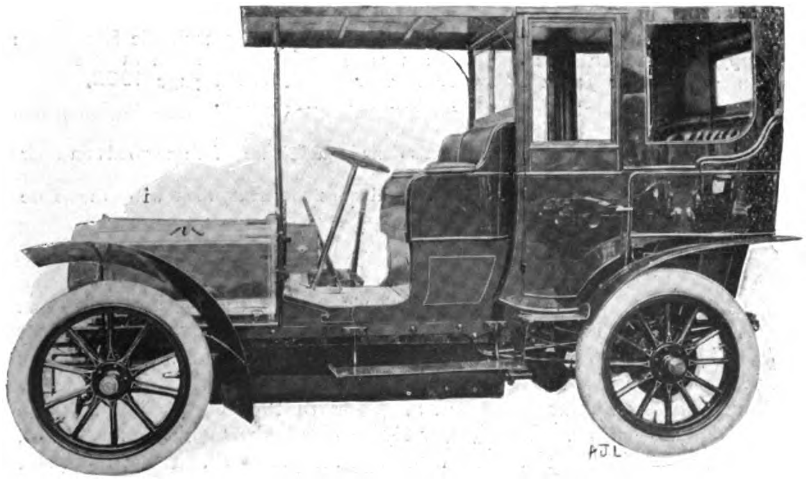


A 24-35-h.p. Rochet-Schneider with Roi des Belges body, hood and side entrance; shown by Messrs. Morgan Donne. This system was fully described in our issue of May 9th, 1903 (p. 470).

rod not only transmits the drive to the front portion of the frame, but also relieves the torque of the back-axle.

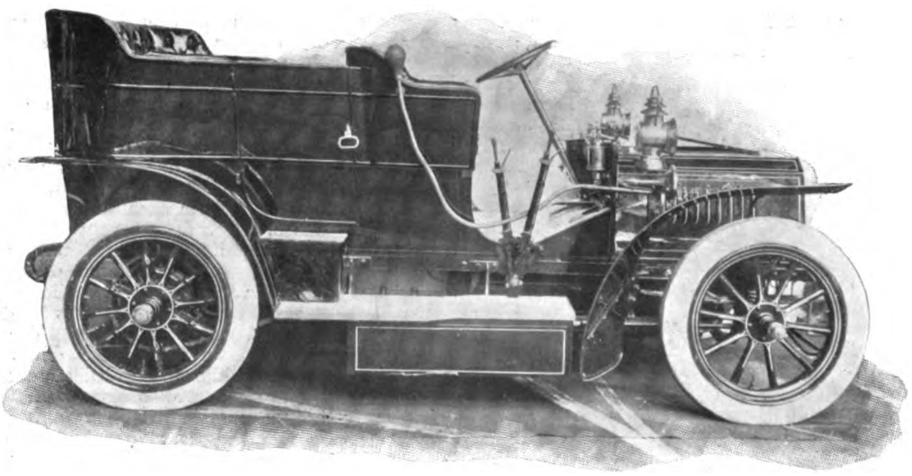
The other Blake motors for launch work were shown in various sizes ranging up to 40-h.p., and some of this maker's new high-frequency trembler coils were also on view. In these, the flat-spring which controls the movements of the trembling armature is held at both ends edgewise, so that it is capable of working at an enormous speed. The armature projects from it at right angles to its face, so that the pull of the magnet upon the armature tends to twist the spring instead of bending it. Several other launch motors were shown by the Putney Motor Company, who, in addition to their Craig-Dorwald models, showed a specially-designed motor-attachment for the propulsion of ordinary boats. In it, a single-cylinder, water-cooled, high-speed motor is placed horizontally with the crank-shaft vertical, so that it lies in a tubular frame that can be clipped to the stern of a boat. The crank-shaft is continued downwards through a tube—outside the boat—and terminates with a bevel-wheel that drives a short horizontal shaft on which a reversible blade propeller is secured. When steering the boatthe propeller and its shaft move with a rudder.

An interesting two-stroke double-acting petrol engine was shown by Durrants Motors, Limited, of Lowestoft, the mechanical construction of which follows very closely upon the lines of steam marine practice. The piston-rod passes through a stuffing-box at the lower end of the cylinder, and this is kept cool by the circulating water. The engine shown was of the 6-h.p. type, and although decidedly larger in comparison with ordinary petrol engines, considering the power developed, appeared to be both well made and carefully designed. Other petrol launch engines of English manufacture were shown by J. E. Hutton, Limited, the Maudslay Motor Company, and Messrs. Horsfall and Bickham; whilst of American construction, mention should be made of the Buffalo 4-stroke motors exhibited by Messrs. Cloud and Nicholls, of Chiswick, and of several types of 2-stroke American motors exhibited by other firms.



A Chenard and Walcker 18-h.p. Brougham with removable top, and side entrance. This system was described in our issue of January 23rd, 1904 (p. 81).

Reference has already been made to the adjustable universal joint which was shown by Mr. W. H. Newman, and we now give an illustration showing one form of this—both complete and taken apart. The inner ends of both shafts are fitted with a pair of projecting jaws, A and B, on the respective shafts, the jaws of the one being placed midway between and at right angles to the jaws of the other. Between the four jaws fit four triangular blocks, C, which, together with the jaws, form a complete circle. A tapering screw-thread is cut on the outer periphery of the blocks, C, and a corresponding ring, D, screwed over them. As this ring, D, is screwed up, so it forces the blocks, C, inward, tightening them up against the jaws, A and B, and thus all backlash can be taken up in the joint when required.



A 15-18-h.p. Brouhot Standard Tonneau with side door entrance. A description of this system appeared in "The Automotor Journal" of January 16th, 1904, page 64.

As usual, all the best-known accessory firms made an imposing display at the show, but from the very variety of the articles exhibited by them it is, of course, impossible to attempt to deal with them individually, or to even mention more than a few names. We cannot, however, refrain from referring to the extremely attractive stall of the Hoffmann Manufacturing Company, of Chelmsford, who have recently given an enormous amount of attention to the application of their special form of ball-bearings for automobile work. Messrs. Ludw, Loewe & Co., who are agents for the D.W.W. ball-bearings—which are those used on the Mercedes cars—were also amongst the exhibitors of such bearings, and they further showed a variety of small tools and gauges for engineers' use. Amongst exhibitors of machine tools, of whom there were quite a number, Messrs. Burton, Griffiths and Co. were prominent with a variety of these useful labour-saving devices that are of such importance in the manufacture of automobiles.

Accessory fittings for steam and petrol vehicles, such as steam-feed-pumps, safety-valves, &c., were shown by Thomas Noakes and Sons, and the public were given a very good opportunity of seeing the very latest types of lamps, for use on automobiles, on the stalls of Mr. A. A. Godin—with his Ducellier lamps—G. Polkey, Limited, and several others. The Bowden Patents Syndicate were once more well to the fore, demonstrating the many uses to which their well-known wire can be applied to motor vehicles and to cycles of all kinds; the Coventry Chain Company were again well represented at the show, and the Imre Engineering Company made a special feature of the new "Universal" silencer of theirs, of which we recently gave a description.

A 16-h.p. Georges-Richard Standard Tonneau with detachable Limousine top, and side entrance. These cars were fully described in "The Automotor Journal" of December 26th, 1903, page 1392, in connection with the Paris Salon.

Most of the large firms who have devoted their attention to the supply of suitable lubricating oils for engines, and for machinery of various kinds, were again well in evidence, amongst these being the Vacuum Oil Company, Price's Patent Candle Company, and Messrs. Stern Brothers, whilst of the important suppliers of petrol the Anglo-American Oil Company were, as usual, well represented.

Although it is impossible to say much with regard to the displays of motor clothing at such shows as these, yet it is impossible not to be struck with the extraordinary amount of ingenuity and attention which has been given to the production of suitable garments for motorists which shall suit their requirements under every sort of climatic condition. At this Exhibition there was no falling off in this respect, and many well-known firms—such as Alfred Dunhill, Limited, and Messrs. Holding and Sons—who have made it their business to cater for the motorist, had very attractive exhibits, while the North British Rubber Company who—following the example of the Dunlop Company — have now a motor clothing department, also made a feature of these goods on their stand.

(Our Exhibition Article will conclude next week with the Tyre Exhibits.)

THURSDAY in last week was the Ladies' Day at the Agricultural Hall Show. A reception by the Ladies' Automobile Club took place during the afternoon. The L.A.C. has now a membership of about 230, and numbers among its officials many prominent ladies of the automobile world. Lady Cecil Scott Montagu, the "chairman," who is an especially ardent motorist, is supported in her club duties by her fellow vice-presidents, Lady Beatrice Rawson and Mrs. Gerard Leigh and a committee of forty-three members.

THE determination to abandon the National Show at the Crystal Palace has, as we anticipated, already brought into the field those interested in the motor cycle trade with the object of organising an Exhibition for these popular machines, in place of the old National Cycle Show. The Motor Cycle Trades' Association, Limited, through their Secretary, Mr. S. J. Sewell, have circularised the trade with the object of finding out if the general feeling is in favour of a separate show for this purpose.

THE USE OF THE HIGHWAY.*

By A. MORESBY WHITE, Barrister-at-Law, F.R.G S., F.R.H.S., &c.

WITHIN the metropolitan area there are further restrictions on speed. It is illegal (*a*) to ride or drive furiously, (*b*) or so as to endanger the life or limb of any person, (*c*) or to the common danger of any passenger in any thoroughfare. Any person found committing any one of these offences may be arrested without warrant by a police-constable.

Again, in any urban district there are further statutory regulations, namely, if a person in any street rides or drives furiously any horse or carriage to the obstruction, annoyance, or danger of residents or passengers. Any constable has power to arrest any offender found committing this offence.

It is a criminal offence for any person having charge of a carriage or other vehicle, by wanton or furious driving or racing, or by wilful misconduct, or even by wilful neglect, to cause any bodily harm to any person. This is misdemeanour for which an offender may be sent to prison for two years with or without hard labour.

It seems extraordinary that, with all this protective legislation in force, it should have been thought necessary to place motor cars under still further restrictions. It has never been apparent to me why the existing provisions of the law were not amply sufficient to protect the public from the motor car, and to safeguard the motorist from the public. Nevertheless, by Article IV of the Local Government Board Regulations, 1896, many of the clauses above mentioned were applied to motor cars, and it was expressly forbidden to drive at a speed greater than is reasonable or proper, having regard to the traffic, or so as to endanger the life or limb of any person, or to the common danger of passengers. Further, by the new Act of 1903, most stringent regulations have been enacted. By Section I these offences as to speed are created :—

(*a*) Driving recklessly or negligently.
(*b*) Driving at a speed which is dangerous to the public.
(*c*) Driving in a manner which is dangerous to the public.

In both (*b*) and (*c*), having regard to the traffic which is, or might be expected to be, on the road, and to the nature, condition, and use oi the highway.

By Section 9 the maximum speed is limited to 20 miles an hour. It is unnecessary for me to comment on the working of this section.

A word on obstructions in the highway is worth consideration. There may be cases where a person injured by an obstruction has no remedy, as it may have been there from time immemorial. A limited dedication of a highway frequently occurs, and this includes a case where the owner of the soil dedicates a right of way to the public subject to an obstruction or defect then in existence. Any one thereafter using the way cannot complain of the defect, or call upon the owner to remove or alter the obstruction, nor has he any claim for any accident which is thereby caused him.

No person has a right to keep his vehicle standing on the highway, whether for his own convenience or to eke out the inconveniences of his own premises. For example, leaving a number of vehicles outside an inn, or an assembly of bicycles or cars outside some repairer's shop.

A dangerous erection or excavation in the highway may, if damage result therefrom, give the injured party a right of action against the responsible person. Even a highway authority has no right to dig holes in the ground and leave them in such a position that anyone reasonably using the highway sustains injury. An obstruction is a nuisance, and ought to be removed, but an individual cannot justify his act if he attempts to remove the nuisance when he might reasonably have passed on his way. If by reasonable care he can exercise his right of passage, he must not personally interfere to abate the nuisance, unless he wishes to risk a law suit. Indeed, to justify himself he would have to prove what the law calls "special damage." Merely having to go round a mile further, and thereby lose a train, would probably not amount to special damage.

Every person who is using the public road is under an obligation to take reasonable precautions, since the neglect of such precautions may result in danger to himself or others.

A misadventure which is inevitable, and occurs through the act of God or the Queen's enemies, gives no person a legal cause of action; so if a branch of a tree be struck by lightning, and fall into the road, and a minute afterwards a driver comes round the corner and runs into it, he cannot complain. Inevitable accident does not mean an accident which could have been avoided, but is something which is the result of *vis major*, or act of God, for which no person is liable.

Again, there may be a mishap, which is a pure accident—one of those ordinary risks of life which every passenger on a road must put up with. This, too, gives no cause of action to any person, as, for instance, if a horse, not being ordinarily a vicious animal, bolts and an accident occurs, then no one is liable. People, when going along the road, must expect to put up with such accidents as reasonable care on the part of others cannot avoid.

It is not necessarily evidence of negligence that a person has not observed the rule of the road. But if he neglects that rule, whether he is a foot passenger or any other person, it lies upon him to show that he took extra precaution. If a person persist on his wrong side of the road, it is the duty of the driver to give way; for if he could have avoided the accident by giving way, then he cannot complain if, by wilfully persisting on a course which he sees must result in an accident, he thereby sustains damage.

A man who is the author of his own wrong merits nobody's sympathy; therefore, if a driver going very fast at night, without a lighted lamp, runs into an obstacle improperly placed upon the road, he will have no cause of action for any damage he has sustained. True, the placing of the obstacle in the road is illegal, but if the driver had not been driving carelessly, and if his lamp had been properly lit, he would have seen the obstacle in time, and should have stopped. It would be no use the plaintiff saying he passed that way in the morning and had a right to expect the way to be just the same when he came back in the evening. A presumption like this does not excuse the duty to take proper care.

In simple cases, as where a person comes sharp round a corner on his right side and runs into a person who is on the wrong side, it is not difficult to apportion the liability; the party on the wrong side is usually liable.

When overtaking give plenty of room. This is a very wise maxim. Suppose that the person leading suddenly swerved out to his right, and as the party overtaking has not given enough room, a smash happens, who is to blame? Clearly the overtaker, who ought to have rung his bell, and to have given plenty of room. For if there are two ways of doing an act, and one is safe and the other hazardous, and he chooses to try the latter course, and shave by as close as he can, he must pay for his pleasure if he damages anybody else. A driver who is passing another vehicle is entitled to plenty of room. This does not mean half the road, but, on the other hand, it does not mean that a cart may compel the motor car to go into the gutter where the road is narrow. The driver of a vehicle is not entitled to try experiments as to how little space will suffice for a car to get by.

If the foolish or malicious driving of a vehicle cause the motorist damage, the driver must answer for it, although the motorist may have lost his head or acted hastily, and thus, perhaps, contributed to the accident; for the driver has no right to deliberately put anyone into a difficult position where, unless he be absolutely cool and courageous, an accident may occur. The malicious driver is also criminally liable under the Highway Acts.

No one is entitled to take advantage of another person's neglect and run over him. If a driver shouts and another does not hear it he must stop and avoid the accident, and if he is going too fast to stop, it is evidence of contributory negligence on the part of the driver.

What is contributory negligence? It means that a person who has a good course of action against another for negligence is disentitled from pursuing his action because he himself is equally to blame.

If he is less to blame then, of course, he could make the man who was more to blame pay for the damage. Supposing a cow is straying on the road, and a motorist coming along very fast runs into the cow, he has only himself to blame. Would it make any difference if the cow's legs had been hobbled or tied so as to prevent its straying far? No; a motorist driving too fast to stop himself in time to avoid the accident would still be guilty of contributory negligence.

It is illegal to allow a horse, cow, sheep, or any such animal to stray on a highway except where the way runs over any common, or waste, or unenclosed ground, and if a driver exercising ordinary care, whether at night or in the daytime, runs into any such animal, he is entitled to be compensated by the owner of the animal for the damage he sustains.

A driver is bound to have his vehicle in proper order. Supposing he has no brake, that is evidence of negligence, and would turn almost conclusively against him. For a latent defect in the workmanship or in the material of the machine which causes an accident, a driver is not liable.

For improper noise made by a car which causes damage to another the car owner is liable; if a silencer is inadequate, and the noise of the explosion frightens a horse whereby damage ensues, the driver of the motor must pay for it.

It would be strong evidence of negligence if a driver had disregarded a danger board on the top of a hill or elsewhere, or was disregarding any local bye-laws. Take the case of a swing bridge over a canal or the like being carelessly left open. The driver has a right to expect it to be shut, but to presume on his right, and, therefore, to drive so rapidly that he is unable to pull up in time to avoid running into the water, would probably be evidence of contributory negligence on his part.

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* A paper read at the Automobile Club on March 17th.

To leave a car unattended in a public thoroughfare may be negligence. Suppose two children commenced to play with it, and one of them starts it, and someone is thereby hurt, the owner of the car would be liable. He ought not to leave his car unattended; the mere doing so may expose him to a statutory penalty under Section 78 of the Highway Act, 1835. To carry the case further: If a car was left for some time unattended in the way, and a horse shied at it, and the driver was thrown out and injured, whereby he died, the owner of the car would be fully liable for all the damage thereby occasioned.

Or again, if a mischievous person removed a car which had been left at the roadside unattended, and placed it in the roadway, whereby an accident resulted to somebody coming along the road, the owner of the car would he liable for the damage done, as well as the mischievous individual who removed it.

Does an action also lie against the road authority or any local authority which is responsible for the state of the road? Yes, it does, if the authority has done anything which it ought not to have done, for this is a misfeasance. If the authority merely neglects to do something, as not repairing the road, no action lies against them, for this is nonfeasance. It cannot be too clearly or widely recognised that no action lies against a road authority for the bad state of the road, or for any accident arising therefrom. Supposing there are tramlines in the road, and the roadway gets worn down, and the metal rail is left exposed, whereby the traveller sustains an accident, has he any cause of action? The tramway company, under Section 28, Tramways Act, 1870, must repair the road between the rails and for 18 inches beyond them, and would be liable to the traveller. But under Section 29 the highway authority may agree with the company to repair the whole roadway; if such an agreement is made neither are liable.

Of course, if the tramway company have allowed their lines to get into an improper state, they are certainly liable; the *quasi* interest which the public have in getting conveyed along the lines is not so great as the public interest in the safe user of the highway. Most tramway companies have their private Acts, which may affect their common law liability.

The highway authority is not an insurer of everybody that passes along the way, but they must execute any repairs they choose to make with proper precautions, for if they leave road-repairing materials in the highway without being properly fenced off, or protected by a light, it is a misfeasance for which they are liable.

If an accident happen because the way is dangerous on account of its surroundings, *e.g.*, the way runs near a precipice, or beside an open drain, or a sewer or a river, has the driver any remedy against the road authority? No; because they are under no obligation to fence the road, not even to maintain an existing fence. The road authority may be criminally liable, but not civilly. Could the injured person bring an action against the owner of the sewer or the river? No; because the presumption is that the right of way was a limited dedication, subject to the then existing drawbacks and dangers on the way when it was first made public. Of course, if the dangerous place has come into existence after the road became a public way, *e.g.*, a new sewer is constructed, then the individual responsible for the creation of the existence of the danger is liable for any damage caused thereby.

In dealing with the use of the highway, I have endeavoured to point out what a highway is, how persons travelling along it ought to use it, how accidents on the road may be considered in some general cases. The subject of the repair of the highway is beyond the scope of the paper, and if we were to enter the wayside inn to discuss the various and curious rights and duties pertaining to the innkeeper, our conversation would be unduly prolonged. These very interesting matters must be dealt with separately; any enquiries on either point will be welcomed and answered. Naturally this paper must be a dull one; if it were made very interesting it might cease to be accurate, and then it would assuredly lose any little recommendation it may possess to your kind reception.

MESSRS. W. BATH AND SON, of King's Lynn, one of the oldest established British firms of coachbuilders, holding for many years the Royal Warrant, have decided to take a very active interest for the future in the automobile industry, and have secured with that object the extensive premises recently occupied by E. W. Hart at Lorne Gardens, St. John's Wood.

ALCOHOL AS A MOTIVE POWER.*

By W. R. ORMANDY, D.Sc., of Messrs. J. Crosfield and Sons, Soap and Chemical Manufacturers, Warrington.

IN introducing his subject, the author pointed out that the chemical trades in this country were suffering to a very great extent from not being able to obtain cheaper alcohol, and that, in consequence, the position was extremely serious. Those interested were again trying to get the laws relating to the taxation of alcohol altered, although similar agitations hitherto had met with but limited success. His company—Messrs. Crosfield and Sons—had naturally taken a very great interest in the movement, and they had sent members of their staff to those countries where alcohol is largely used, to obtain full information concerning it. As a result of these investigations—in which the author had taken no small part—they had been very forcibly struck with the fact that, although the quantity of alcohol used by the chemical trades is very large, yet by far the largest demand for it on the Continent is in connection with the development of power, light, and heat. Realising the wider importance of the subject, they decided to carry their enquiries further than originally intended, and to invite the co-operation of all societies and firms who are in any way interested in the production, use, or distribution of technical alcohol. For this reason he and Messrs. Crosfield were only too pleased to have this opportunity of giving such information as they possessed, and of enlisting the sympathies of the Automobile Club.

Owing to the vastness of the subject, and the consequent impossibility of more than touching upon some of its phases, the author expressed his intention of devoting his chief remarks to the direct technical aspect of the question. He led up to the interesting facts he was about to give concerning the employment of alcohol for automobile engines by pointing out that the relatively high price of the unsuitable methylated spirit sold in this country was responsible for the small amount that had been done to use it as a fuel, and that, although more progress had been made with alcohol for the propulsion of motor vehicles in France, yet the quantity consumed as fuel by engines in Germany was far larger. He then referred to early experiments made in 1895 by Prof. Hartmann with a Grob motor—with which efficiencies of 13·6 per cent. and 12·2 per cent. were obtained for petroleum and alcohol respectively—and to Prof. Slaby's tests of a new alcohol carburettor on a Körting motor, which showed a consumption of 550 as against 839 (Grob) grammes per b.h.p.—and mentioned that between 1897 and 1901 many makers had constructed motors which ran on a consumption of 390 to 440 grammes of alcohol per b.h.p.

Continuing, he said:—The reason why alcohol was so long neglected for internal combustion engines, when efforts were being made in every direction to find an outlet for the over-production which was taking place, was that the heat of combustion of alcohol is 5,500, and of petrol and paraffin about 10,250. At first it would appear hopeless to compare them unless the price of the one was approximately half that of the other. If the value of a fuel were indeed measured by its heat of combustion, this would be the case; but fortunately we depend rather on the number of calories which can be converted into work. Out of the ten alcohol-driven gas engines entered in 1902, in the competition for the prize offered in that year by the German Agricultural Society, no less than three gave efficiencies of from 32·7 to 30·9 per cent. when working on full load. This astonishing result places the alcohol motor very high in the list as an economical machine for the conversion of heat into work, and it is certainly of interest to note that the degree of compression used was on the whole very much higher than that which it is customary to use for petrol-driven motors. In some cases a compression up to 10¼ atmospheres was used, and the greatest explosion pressure attained was 33 atmospheres. The results obtained appeared to show that the higher efficiency of the alcohol motor is due almost entirely to the high compression which can be used.

We ask, then, how comes it that this compression can be used in the case of alcohol and not in the case of petrol? During compression of a mixture of any fuel as vapour and air, heat is given out, and at a certain point the temperature is such that explosion takes place. This point fixes the absolute limit of compression, for if the compression be carried beyond this point we get pre-ignition. Now the temperature depends largely upon the specific heat of the substance in the mixture. In the case of petrol this is very low; in the case of alcohol it is very much higher, and we have also to bear in mind that the spirit used in these experiments contained 10 per cent. of its volume of water, and that the influence of water is to allow of a very much higher compression; in the case of the new Voigt motor, using coal gas and air in the presence of steam, it was found necessary to produce compression pressures of twenty-five atmospheres before self-ignition took place.

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*Excerpt from a Paper read at the Automobile Club, March 24th.

A study of Professor Meyer's work leads to the conclusion that the increased efficiency of the alcohol motor is entirely due to the increased compression employed, and the possibility of employing this compression is due to the low inflammability of alcohol-air mixtures, but, in a higher degree, to the water contained in the alcohol. But he has also shown that the addition of further water without a corresponding increase in compression has a disadvantageous effect, for the maximum pressure of explosion is reduced, and the combustion is diminished in velocity. His tests, indeed, go far to prove that the increased effect is in no wise due to the presence of water after the explosion has taken place, which is what one would expect on theoretical grounds, when we consider that the amount of heat necessary to split up the water is exactly equal to the amount which can be given out on the re-combination of its elements. It is true that by increasing the compression we may use alcohol containing an increased percentage of water, and obtain better useful effect from the fuel, but the percentage gain attained by compression beyond 10 or 12 atmospheres is so small that the greater uncertainty of ignition, and the added expense of constructing motors to withstand the higher explosion pressures, more than counterbalance it.

If the above conclusions are correct, the generally received idea that a petrol motor can be converted into an efficient alcohol motor, simply by altering the carburettor, is proved to be fallacious. It is true that the conversion of alcohol into a state fit for explosion requires other means than in the case of petrol. This is obvious, when we consider that the heat required for the evaporation of alcohol is about two and a half times as great as that for petrol, and we have further to bear in mind that there is 10 per cent. of water present, requiring five and a half times the amount of heat to evaporate it, compared with an equal weight of petrol. At first sight it would seem that this would be a serious difficulty in the utilisation of alcohol, but the actual amount of heat which is necessary to evaporate a certain quantity of alcohol containing 10 per cent. of water, amounts to only 5½ per cent. of the total heat of combustion of that same amount of alcohol (the heat which would be given out by the water vapour in the products of combustion condensing from the form of steam is not taken into consideration). This amount of heat can readily be abstracted either from the exhaust gases or from the cooling water.

The temperature to which the ingoing air into the carburettor must be heated in order that the mixture of air, alcohol, and water passing into the cylinder may be such that there is no necessity for any of the constituents to be in a state of suspension as liquids, is only 190 deg. C. This comparatively high temperature is only required when the mixture contains the maximum amount of alcohol which the oxygen present is able to fully consume, and this, I need scarcely point out, is a state of affairs which it is not desirable to have. It is also easy to prove, in those cases where the air is not warmed prior to entering the carburettor, that it is only necessary to give the mixed vapours a final temperature of 30 deg. C. This, I am sure you will admit, is something which is quite easily within the bounds of possibility. It is interesting to notice, in Prof. Meyer's results, that the motors tested, which worked with a strongly heated mixture, and in consequence at a lower compression, did not give such economical results as the motors working with a cooler mixture and a higher compression.

I am here not taking into account the possibility of some form of Diesel engine being used for motor car propulsion. Its efficiency is about on a par with that of a good alcohol engine, but on half load it is more efficient. There are, however, grave mechanical difficulties to be faced before this type of engine can be used to replace the light high-speed petrol engine.

Referring further to the construction and working of alcohol engines, he said:—The inlet valves and induction tubes should be made as wide as possible in order that the diminution in pressure shall be as small as possible, otherwise the expansion produced will lower the temperature, cause the fuel to separate in the liquid state, and reduce the uniformity of the mixture. This also points to the probable superiority of the M.O.V. as compared with the A.O.V. It is especially necessary to design the cylinder in such a way that equal cooling of the walls takes place. One hot projection, or extra hot surface, however small, would determine the compression which could safely be used, and so regulate the thermal efficiency. Similarly the admixture of spirit and air should be as intimate and as cool as possible, because, other things being equal, the pressure and temperature of self-ignition is lower, the hotter and richer the original mixture.

(*To be concluded.*)

Under the title of Automobil Technische Gesellschaft, a technical society has been formed in Berlin to deal in a practical form with the scientific side of automobilism.

CLUB DOINGS.

Burnley and District Automobile Club.—As a preliminary to the opening run of the season, fixed to take place on April 30th, the chairman, Mr. Councillor Atkinson, of Barrowford, invited the members and a number of automobilists in the district to join him as his guests at the Bull Hotel, Burnley, last week, to participate in a Lancashire "hot pot." The entertainment was voted an enormous success, and the only regret was the absence of Mr. Harold Smith, who had arranged to give a paper on motoring topics. The proceedings, however, were not allowed to drag, as a number of visitors present gave some interesting and amusing accounts of their experiences and troubles in connection with the management of their cars. The meeting resulted in the addition of several new members to the club.

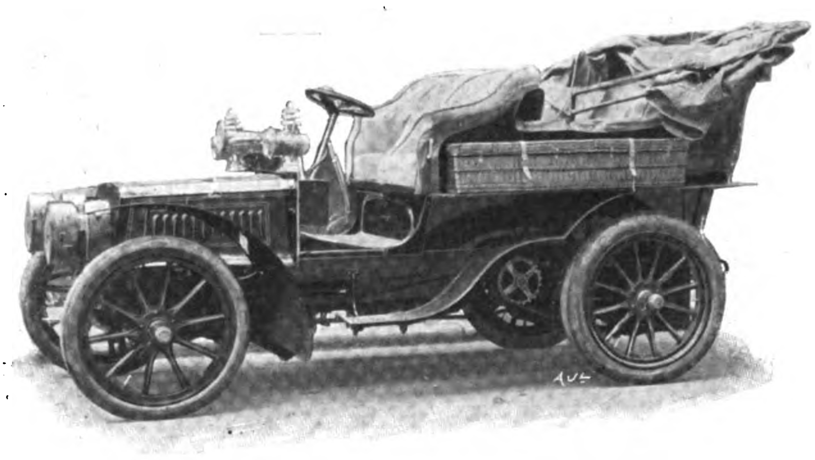
East Surrey Automobile Club.—The first Annual General Meeting of the above club was held at the White Hart Hotel, Reigate, on Saturday, the 26th inst. Major Kingsley O. Foster, J.P., presided, and amongst those present were Messrs. C. H. Whittington, Gunning Keen, Hughes, Bowden, Makovski, Boulter, Macaire, Mercer, Col. Robinson, Drs. Hewetson and Wakefield, and D. J. Barry (hon. sec.). Major Kingsley O. Foster was unanimously re-elected president, and the following gentlemen vice-presidents: Sir A. Rendel, Sir G. Livesey, Captain R. H. Rawson, Col. Robinson, Messrs. J. Underhill, H. N. Cornsellis, for the ensuing year. Mr. D. J. Barry was unanimously re-elected hon. sec. and treasurer. It has been decided to admit ladies to membership of the club, and rules have been altered accordingly.

REVIEWS OF BOOKS.

"English and American Steam Carriages and Traction Engines." By William Fletcher. (London: Longmans, Green, and Co., 15*s*.)

Mr. Fletcher in this work gives a discursive account of most of the leading makes of traction engines and steam touring cars, commencing with an historical summary which describes some interesting vehicles, but from which several others equally interesting are omitted, we understand, because they have been included in the same author's other work on the "History and Development of Steam Locomotion on Common Roads." The work is well illustrated throughout, and, as admitted in the text, several of the descriptions, notably of the White and Chelmsford cars, are compiled from the descriptions of these vehicles which appeared in the pages of The Automotor Journal, though the description of the White car is rather too condensed, and not arranged in such a way as to give anybody who does not understand it a really clear impression of the White system. There is rather a humorous chapter describing early experiences with traction engines on the road, which sometimes must have been rather terrifying to the inexperienced driver, notably, the man who determined to change his gears on a down hill, and had the traction engine run away with him in consequence. If we might make a suggestion we would venture to hint that in future editions of the work the historical might be more clearly separated from present-day practice with advantage.

We are glad to learn that the systematic teaching of driving and repairing motor cars is spreading. Hardly a week passes now without some fresh notification to this end coming to hand. We learn that the British Automobile Commercial Syndicate, Limited, of 97-98, Long Acre, have an opening at the present moment for a few young men to join their staff for this purpose. This company has been for the past two years making a speciality in this direction.



Messrs. Panhard and Levassor, of 14, Regent Street, have sent us a photograph of the above very elegant car, which has just been received by them from France. The vehicle is of 24–32-h.p., and is fitted with steel cylinders. It is capable of travelling at speeds up to 60 miles per hour.

RACES, RECORDS, AND TRIALS.

Having scored the long-distance automobile record of 13,795 miles through fifteen European countries and across the Arctic circle, Mr. Charles J. Glidden, of Boston, Mass., now seeks to further extend this remarkable record. He has mapped out a new itinerary for the present year totalling to 20,000 miles, which he hopes to cover on his 24-h.p. Napier car, on which he accomplished his first record performance. Mrs. Glidden will accompany her husband, and Mr. Charles Thomas, of London, who will act as engineer, will be one of the party. Mr. Glidden proposes to start eastwards about October 1st of this year, and hopes to cover the whole of his mapped-out route in 365 days. On account of the climate, probably the journey will be divided into two sections, the first terminating at Athens at the end of this year, the travellers returning to Boston and restarting from Athens in October, 1905. By this means they will pass through the warm equatorial climates at the best season of the year. The following is a rough outline of the countries to be visited, the distribution of the mileage in each country, and the order of travel :—

England (261 miles), France (812), Spain (800), Portugal (500), Algeria (1,000), Tunis (460), Sicily (364), Italy (970), Hungary (588), Turkey (295), Greece (500), Egypt (450), Palestine (300), India (5,000), Ceylon (500), East India (300), China (100), Japan (2,500), Hawaii (300), United States (4,000); total, 20,000. The roads of China are narrow and totally unfit for motoring outside Hong Kong, and the restrictions imposed by the Government make a drive of any extent impossible. Of unusual interest will be the drive in Spain, Portugal, Algeria, far into the desert of Sahara, in Palestine and India, skirting the Himalayas, under the feathery bamboo and bread fruit trees of Ceylon, on the islands of the East Indies, and in the flowery kingdom of Japan. If time will permit and climatic conditions are favourable, when in the locality, the Philippines will be included in the schedule.

Extensive arrangements have been made for petrol distribution and supplies at all points and escorts where it may be necessary for safety. An idea of the extent of the tour may be gathered from the fact that 18,000 miles of steamship transportation for passengers and automobile will be necessary.

A new automobile record for the journey from John o' Groat's to Land's End was last week made by Mr. Douglas Whitehead, who covered, by the route he followed, the distance of 927½ miles in 52 hrs. 35 mins., against the previous best time on record of Mr. J. W. Stocks, who covered the distance between these two points by a route 888 miles in length, in 62 hrs. 30 mins., Mr. Whitehead being to the good, therefore, by 10 hours all but five minutes, and in actual running time (45 hrs. 3 mins.), beating Mr. Stocks by about three hours. The original intention was to make the journey a non-stop run, but delays in connection with petrol and lost ways, &c., early in the attempt rendered this impossible. The start was made on Thursday from John o' Groat's at 8.15 a.m., and Land's End was reached on Saturday at 12.50 p.m. The car selected for the journey was a 10-h.p. Argyll, two persons besides the driver travelling the full distance.

The Massachusetts Automobile Club propose repeating their hill climb on Commonwealth Avenue Hill, Boston, on April 17th next, on similar lines to last year.

Next year's races on the Florida Beach, arranged by the Florida East Coast Automobile Association, are announced to take place between January 17th and February 6th. Mr. C. G. Burgoyne is the new president of the society, and has arranged for a new Beach Club-house to be erected, situated near the South Trail. Next year the whole of the races will be invitation events, and an increased entrance fee will be charged.

The Auto Cycle Club Side-Slip Competition.—The following entries have been received for this trial :—

Mr. Bentley Tollemache.—Leather band with steel studs, inside of which are strips of aluminium, and corresponding strips of asbestos, &c.

Mr. W. Maitland Edwards.—Toughened chrome leather cover, vulcanised to tread, with bifurcated rivets at suitable intervals.

Mr. W. Hayes.—The Empire B.P. support, fitted to chain and top stays of frame by clips.

Messrs. Parsons, Non-skid Company.—The well-known Parsons chain encircling tyres.

Messrs. Wilkinson, Tyre and Tread Company.—A tread perforated with wires, to be vulcanised or solutioned on the tyres.

Messrs. W. and A. Bates.—A non-slipping tread made of rubber, to be attached to tyres by solution, or vulcanised thereto.

The trials will commence on April 18th with the Endurance test of 1,000 miles, at the same time as the trial for cars, and the Side-Slip tests will also be made on the prepared track at the Clement Talbot works near Ladbroke Grove.

A FUEL consumption trial for motor bicycles took place on the 25th inst. under the auspices of the Motocyclist Union of the A.C. Austria. The trial was over 100 kiloms. on the Vienna-Neustadt road and the results were as follows :—

Amateur Class.—1. Tilgner (F.N. motor), 0·88 kilog. fuel. 2. Hatschek (F.N.), 1·05 kilog. 3. Klokotsch (F.N.), 1·18 kilog.

Manufacturers' Class.—1. Slift (F.N. Herstal), 1·23 kilog. 2. Pittlik (Laurin and Clement), 1·50 kilog.

Jointly with the A.C. Bordelais it has been arranged by the A.C. Dordogne to hold a hill-climbing contest at Perigruex, over 1 kilom., on May 15th next.

An endurance trial for all types of automobiles is being organised in Berlin by the Berliner Automobil-Verein and the Leipziger Automobil Club jointly to take place on May 8th next. The larger vehicles taking part will travel between Berlin and Leipzig, via Potsdam, Wittenberg and Bitterfeld, a distance of about 320 kilometres, the smaller vehicles taking the direct route between Berlin and Leipzig. A maximum time will be allowed for the longer journey of 11½ hours and a minimum time of 9½ hours, and for the shorter journey 7 hours and 4½ respectively.

Last week the Prince and Princess of Wales availed themselves of the "fleet" of five Humberettes at the Royal Naval Barracks, Portsmouth, for the inspection of the buildings. Lieut. Stevenson, R.N., drove the Prince, the honour of driving the Princess being assigned to Professor F. J. Dykes.

Mr. Moffat Ford is "fertile in expedients," and frequently comes out in a new *rôle*. His last, as our readers will remember, was as the champion of the rights of the public and a thorn in the flesh of the tramway companies who have made a practice of exceeding the legal limit of speed. Now Mr. Ford is coming forward as the organiser of personally-conducted holiday tours, in which quite large parties are to be taken about the country in a monster motor car. From the illustrations published in the daily press one is inclined to imagine that Mr. Ford has become a dreamer of dreams and seen in the land of vision the resuscitation of Church's steam coach, for Mr. Ford's car is very like it in design, having internal compartments, seats on the roof where the passengers will be protected from the weather by umbrella awnings, and warmed in the rear by the cook's galley, who will prepare the meals as the vehicle speeds along. Stopping for the night, the ladies of the party are to sleep inside the vehicle, while a tent is to be pitched for the sterner sex. The big vehicle is to carry from 20 to 25 passengers, and a motor cyclist is to go on in front and prospect the camping ground. We wish Mr. Ford's provisional scheme all success, but if his 25 passengers all return together it will prove a miracle of organisation, tact, and management.

His Majesty the King has again honoured the Daimler Motor Company, of Coventry, with an order for one of the latest type 1904 cars. This is the sixth car which His Majesty has purchased from this company, and the car selected this time will be of 28-36-h.p. As we announced recently, H.R.H. the Prince of Wales also ordered a car a few weeks ago of the same type as His Majesty has now ordered, His Royal Highness's order being given after a fifteen months' test of the car previously built for him by the company.

The course suggested by Mr. Linton Hope, for the British International Cup for Motor Boats, is from Ryde to Osborne Bay and back for a southerly wind. In the event of a northerly wind blowing, the course might be in Stokes Bay instead.

Fifty-two firms participated last week in the first ballot for space at the Society of Motor Manufacturers and Traders Automobile Show, of 1905, at the Crystal Palace. The whole of these firms have entered into a bond not to exhibit at any other Exhibition in that year, and by the time the second ballot has taken place and the whole of the applicants for space have had their requirements dealt with, it already appears as if there would be practically no available space for late comers in the show. The following 43 firms secured the largest space permitted under the rules for the coming show, viz., 800 square feet each :—

S. F. Edge, Ltd. ; Gladiator Company ; Ariel Motor Company, Ltd. ; Electromobile Company, Ltd. ; Ryknield Engine Company ; Dennis Brothers, Ltd. ; Panhard and Levassor ; Keene's Automobile Works, Ltd. ; De Dion Bouton ; Sir W. G. Armstrong, Whitworth and Co., Ltd. ; Lea and Francis, Ltd. ; Eagle Engineering and Motor Company, Ltd. ; Anglian Motor Company ; Wolseley Tool and Motor Car Company, Ltd. ; Hozier Engineering Company, Ltd. ; Speedwell Motor and Engineering Company, Ltd. ; Daimler Motor Company, Ltd. ; Société Francaise des Cycles Clément and Gladiator, Ltd. (E. L. Lancaster) ; Firefly Motor Company ; Simms Manufacturing Company, Ltd. ; Anglo-American Motor Car Company, Ltd. ; Weston Motor Syndicate ; Thornycroft Steam Wagon Company, Ltd. ; Duryea Company ; C. S. Rolls and Co. ; London Motor Garage Company, Ltd. ; J. A. Lawton and Co. ; Locomobile Company of Great Britain, Ltd. ; Albany Manufacturing Company, Ltd. ; Albion Motor Car Company, Ltd. ; Chas. Jarrott and Letts, Ltd. ; Olds Motor

Herr Eugen Sandow, the well-known athlete, is seen in our photograph at the steering wheel of his 12-15-h.p. Argus Car, the product of the Argus Motoren Gesellschaft Jeannin and Co., of Berlin. In the car are Mrs. Sandow and her two little daughters.

Works; De Dietrich et Cie.; Minerva Motors, Ltd.; Motor Car Syndicate, Ltd.; Belsize Motor Car and Engineering Company, Ltd.; Pick Motor Company, Ltd.; White Steam Cars.

Commercial Vehicles:—Thornycroft Steam Wagon Company, Ltd.; Straker Steam Vehicle Company, Ltd.; Milnes-Daimler, Ltd.; Clarkson, Ltd.; Sirdar Rubber Company.

Firms securing smaller spaces were:—Ryde Motors, Ltd. (600 ft.); Vauxhall Ironworks, Ltd. (500 ft.); Laurie and Marner, Ltd. (400 ft.); Sir W. G. Armstrong, Whitworth and Co., Ltd. (400 ft.).

Accessories firms taking space were:—United Motor Industries, Ltd. (500 ft.); W. H. Wilcox and Co., Ltd. (240 ft.); William Hills, Ltd. (200 ft.); H. Waterson and Son (200 ft.).

For the display of motor boats the Simms Manufacturing Company, Ltd., secured a 300 foot space.

Starting with the coming summer, the glorious Valley of Aosta is to be opened up by means of automobiles. The cars will travel to Montiers by the defile of the little St. Bernard. It is hoped to attain an average speed of about 19 miles an hour, and the fares are to be upon the moderate scale of about 3*d.* per kilometre.

M. Henry Deutsch de la Meurthe has made a generous offer to the French Aero Club, to encourage the science of learning to fly. He has decided to give a sum of 25,000 francs as a prize to the inventor of a flying machine upon the heavier-than-air principle, who shall by this means fly to a certain point and return to the starting point, covering a total distance of one kilometre. The details governing the prize will be issued later.

The Extra Parliamentary Commission, appointed by the French Government to inquire into the whole question of the speed and regulation of automobiles in France, have resumed their sitting, and are now carefully considering the whole of the reports which have been prepared and submitted for their consideration, and are daily taking evidence to enable them to come to a final decision. Up to the present, some very important resolutions have been practically approved, and, no doubt, formal regulations will, in due course, be forthcoming, giving effect to these resolutions. The main points so far agreed are that for controlling automobiles there shall be three classes, viz.:—

(1) For cars developing a speed up to 40 kiloms. per hour.—These vehicles will not have to carry any number whatever, or be subject to any official declaration.

(2) Cars with a speed from 40 to 60 kiloms.—For these vehicles the existing regulations, requiring certificates of competency to drive, will be more strictly enforced than ever, and probably elaborated.

(3) Vehicles capable of a speed greater than 60 kiloms. per hour.—These vehicles will not be permitted to be sold or travel anywhere except under special authorisation and in very rare cases. A special plate, issued by the Service Des Mines, will be attached to each chassis of this class, giving the gear ratio between the motor and the wheels. Any alteration in gear ratio must be immediately notified to the authorities, and a new plate obtained.

It would, therefore, appear that the maximum speed allowed generally in France will be 60 kiloms. per hour.

Dealing with the question of issuing general certificates for driving competence, the enormous difficulties in the way have compelled a postponement of this question to be made for the present, but there appears every probability that an effort will be made to issue regulations in this direction.

LAW REPORTS.

Napier *v.* Jarrott.—This case, which we referred to last week, was concluded on Wednesday, when Mr. Justice Kekewich gave judgment in favour of the plaintiff. His lordship upheld the terms of the agreement, and stated that, although it was suggested that the shares in dispute belonged to the plaintiff and the defendant jointly, the only inference that could be drawn from the agreement was that these shares should be deemed the plaintiff's shares, and he thought that it was never intended that the defendant should be privileged to interfere with the use by the plaintiff of those shares. He therefore granted an injunction restraining the defendant from voting otherwise than as directed by the plaintiff. The injunction was stayed for a time to enable the defendant to appeal if so advised.

DOINGS OF PUBLIC COMPANIES.

Motor Van Syndicate, Limited.—It has been determined by the members of this Company to wind up voluntarily. Mr. T. C. Palmer, of 98, Commercial Road, E., has been appointed liquidator.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Belgravia Garages (Limited).—Capital, £1,000 in £1 shares.

City Automobiles (Limited), 34, Queen Street, E.C.—Capital, £10,000 in £1 shares. Object, to adopt an agreement between R. Clegg and A. H. Salmon for the transfer of certain premises, and to carry on the business of motor car stores, manufacturers, repairers, &c. First directors, E. Manville, J. M. Gorham, and E. A. Locock.

Doherty Motor Accessories Company (Limited), Trafalgar Works, 8½, Upper Wells Street, Coventry.—Capital, £5,000 in £1 shares. Object to acquire the business now carried on by W. H. Doherty, F. J. Page, J. Welch, and J. Bayley, at Trafalgar Works, Upper Wells Street, Coventry, as the Doherty Motor Accessories Company. First directors, J. M. Fenton (chairman), W. H. Doherty, F. J. Page, J. Welch, and J. Bayley.

Dougills Engineering (Limited).—Capital, £70,000 in £1 shares. Object, to carry on the business of mechanical and electrical engineers, steam, gas, and oil engine makers, &c.

Herbert and Beach (Limited), 16, Darlington Street, Wolverhampton.—Capital, £2,000 in £1 shares. Object, to acquire the business of J. F. N. Herbert and W. Beach, dealers in cycles, motors, &c., at 16, Darlington Street, Wolverhampton, as Herbert and Beach. First directors, J. F. N. Herbert (managing director) and W. Beach.

Sir Hiram S. Maxim Captive Flying Machine Company (Limited), 44, Gillingham Street, Westminster.—Capital, £30,000 in £1 shares. First directors, Sir H. S. Maxim, Kt., A. Hardy, J. Woolf, jun., and A. Davison.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published March 31st, 1904.

5,706. H. Heatley and W. Hunt. Motor vehicles.
5,729. H. S. Hele-Shaw. Friction clutches.
5,730. H. S. Hele-Shaw. Clutches, brakes, and dynamometers.
8,142. T. S. James. Explosion engines.
8,257. H. S. H. Cavendish. Apparatus for preventing lateral slipping of the wheels.
10,612. W. Starley. Motor road vehicles.
13,406. W. A. Lloyd's Cycle Fittings, Limited. Internal combustion engines.
14,473. C. Nielsen. Pumps for inflating tyres.
22,135. J. W. Hunter. Driving mechanism.
28,392. A. E. Brillie. Automobile vehicles fitted with hauling and lifting mechanism.

Applied for in 1904.

Published March 17th, 1904.

450. Soc. Ossant Frères. Exhaust silencers.
1,386. J. S. Pletts. Variable speed gear.
1,667. R. Bellingham and J. Bloomfield. Pneumatic tyres.

Published March 24th, 1904.

626. B. Robinson. Indicator plates.
1,987. F. Damokos. Automobile sledges.
2,079. W. Peck. Internal combustion engines.
2,293. A. Parr. Device for recording speed.
2,333. A. Barker and H. Sidebottom. Valves for steam and other motors.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

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NICE AUTOMOBILE WEEK.—The Promenade des Anglais, on the extension of which the Mile and Kilometre Speed Races and the Two Coupes de Rothschild were battled for.

THE AUTOMOTOR JOURNAL.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Apl. 16 ...	Examination of Cars for Gordon-Bennett British Eliminating Trials.
Apl. 18–24 ...	*Side-Slip Trials.
May 7 ...	*Quarterly 100 miles Trial.
May 10 ...	British Gordon-Bennett Race Eliminating Trials.
May 14 ...	Nottinghamshire Club Hill Climb.
May 19–20 ...	Glasgow-London Non-Stop Run.
June 1–7 ...	Motor Bicycle Endurance Trial.
June 11 ...	Automobile Races, Ranelagh Club.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
Oct.–Nov. ...	*Light Van Trials (about 2,000 miles).

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Apl. 16–May 31	Vienna Auto Show.
Apl. 17 ...	Coupe Meyan (Motor Boats).
Apl. 18–23 ...	Paris-Nice-Rome.
Apl. 30–May 12	Antwerp Salon.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May 16 ...	Carburettor Trials (A. C. de France).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8–12 ...	A.C. Bordelais Automobile Week.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 27 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 15–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11 ..	Paris-Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

Nice Speed Races and their Lesson.

IN another column, particulars are given of the speed races held last week in connection with the Nice Automobile events. One fact, the importance of which has always been recognised, has been brought home by these in a very practical manner, viz., the absolute necessity in long distance races—where there are a number of controls and stoppages—of each car, however powerfully it may be engined, being able to come rapidly to a standstill from top speed, and being capable of quick acceleration to its full stride each time that it is re-started. Although last year's Gobron-Brillié car, driven by Duray, is of considerably lower power than the new Gobron-Brillié racer, driven in the events by Rigolly, yet it was able to out-distance its more powerful sister vehicle in the De Caters Cup race, when the distance from a standing start was only half a kilometre, whereas when matched against Rigolly's machine on the longer stretch of a kilometre and a mile, Rigolly in each case showed a considerable advantage in time. This result was entirely due to the quick getting away of the 1903 car. Too much stress cannot therefore be laid upon this fact, and we trust that in the British Eliminating Trials, which we hope to see carried through in the Isle of Man, a number of controls will be established corresponding with the number which are likely to be established on the Taunus course, so that the capabilities of the drivers and the flexibility of the machines may be thoroughly proved under these actual racing conditions. The controls need not necessarily be at populated points so long as controls are established. What is wanted is a series of stops and re-starts by which the total loss by slow starting may be ascertained approximately. The position of racing cars is very different at the present day than in the past. It is not at all certain, in long races like the Gordon-Bennett Race, that any considerable difference in time will be found at the finish between the leading cars. A few minutes only may separate the first and the second vehicles, and it is, therefore, upon such slight advantages that in all probability the race will be won.

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The Isle of Man and Automobilists.

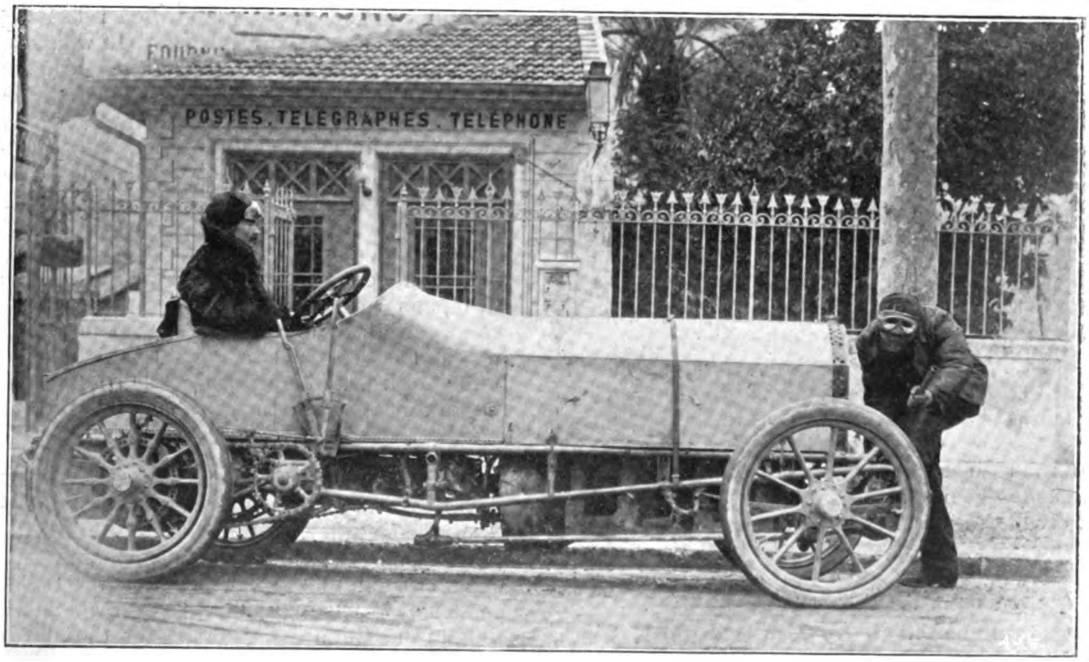
Already there appears to be some inconsiderate driving taking place in the Isle of Man, and the complaints which naturally follow these ill-advised proceedings are finding their way into the local press. Everything is being done by the local authorities to make the trials, if they take place in the island, a success, and to give the most reasonable latitude to automobile visitors during their stay, but during the last fortnight several cars are reported to have been tearing round the roads to the amazement and terror of the islanders, who so far have had very little experience of fast travelling motor cars. Drastic steps should be taken by the Automobile Club to see that this is at once remedied, even at the cost of making some severe example, for it is a pity that anything should be done to mar the chances of success of what may prove to be a very important occasion for motorists.

Already the proposal, which we announced last week, to hold a series of automobile events in addition to the Eliminating Trial itself, is gaining in popularity every day, and the Mayor of Ramsey and the Town Council have as one man made up their mind, in conjunction with the general public, to help in every way to further this idea. Both the hill-climbing competitions on the day following the eliminating test, and the speed races on the third day, proposed to be held on the Douglas Promenade, should give the Manxmen an idea of the powers of automobilism to draw together a big " gate." It is owing to the peculiarity of the self-governing powers possessed by the island that it is possible to hold the Eliminating Races there, which it is now fully anticipated will be sanctioned by the King, but from every point of view the island is particularly well suited for such an event.

To those who are fond of diving into ancient customs and their origin, the island and its traditions should prove a subject well worthy of research. This quaint little portion of the King's dominions positively teems with quaint usages and ancient customs, of which the whole populace are rightly proud. From Mr. Gillmore of Douglas, who is himself an automobilist, and who is so actively interesting himself in promoting the success of this automobile meeting, we have received some particulars in regard to the country and its customs. He speaks in the most enthusiastic terms of the Snaefell Mountain Road, the scene from the top of the mountain, a view of which we gave last week, being one never to be forgotten. The whole of the island can be seen from this point, and on a clear day England, Ireland, and Scotland can be clearly defined, with now and then a peep of the Welsh mountains.

Amongst the many queer and quaint laws and customs on the island the following will suffice as examples :—

A man may buy as much real property as he likes, but he cannot sell or mortgage any of it unless his wife signs the deed. The deeds of sale of property are never



NICE AUTOMOBILE WEEK.—Rigolly on his 1904 Gobron-Brillie Car, on which he, last week, accomplished the Marvellous World's Record Speed of at the rate of over 152½ kiloms. per hour (94·7 m.p.h.). This is one of the vehicles which will take part in the French Eliminating Trials for the Gordon-Bennett Race.

given to the owner, but are kept for him by the Local Government in the Record Office. The owner only gets a receipt for his deed, on production of which, and one shilling, he can see his deed when required. No English solicitor or lawyer can plead in the Manx Courts, but must do so through a Manx lawyer.

A happy privilege which residents in the island enjoy is freedom from income tax, and stamp duties on cheques, deeds, and agreements.

An achievement to be proud of is that the Lifeboat Institution originated in the island. The Derby is also supposed to have been started in the island by one of the Earls of Derby, who owned the whole of the island at one time.

In spite of their quaintness in many things the present powers are up-to-date in most things. A properly organised Board of Advertising has for a considerable time been established, whose duty it is to look after the interests of the little community, and right well do they do it. Free illustrated guides and maps, which are a pattern of what such things should be, are distributed, for the mere asking, with a lavish hand, and no trouble is too great in affording information of a special nature to any tourist seeking their advice.

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For Mutual Protection.

THE question of obtaining efficient drivers for motor cars is daily becoming a more serious matter. This is mainly owing to the rapid spread of automobilism and the rough and ready training which is generally regarded by the average "chauffeur" as sufficing to qualify him to pose as a full blown driver, skilled on all the points arising from hour to hour which require possibly only slight but prompt attention to render motoring a pleasure in the broadest term of the word. Many attempts in a small way in this country are being made to remedy the evil, but the flagrant cases of incompetence which are so frequently occurring render it imperative that some drastic and far-reaching plan should be devised without delay to lessen the trouble. We referred last week to steps to this end being taken in France, and if something similar through the Automobile Club could be officially recognised in England it might help to solve what is without doubt a serious and difficult problem.

The French Efficiency Diploma, to be issued by the Association Generale Automobile, will not only record the proficiency in driving of each applicant, but will also certify to the knowledge of each candidate in regard to the various parts of the vehicle and each individual's capability of being able to take to pieces and re-assemble any of the mechanical parts of the vehicle. It will also have something to say upon the physical capabilities of each driver. The register will be open about the middle of this month. The French Extra Parliamentary Commission, taking evidence in regard to the regulations of automobiles, propose to leave the responsibility for this section of the regulations in the hands of the Association, the Service des Mines merely attaching their signature to the certificate upon the recommendation of the Association.

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Accidents and the Fashion in Head-lines.

APROPOS of the accident between Rye and Hastings, where a motor car is said to have run down a wagonette, happily without fatality so far as is yet known, and the recurrence of another disaster on the ill-omened Grove Hill at Harrow, it is unfortunate that every general holiday should be marred by an invariable "crop" of accidents. Apparently this Easter has been no exception, although we fail to see sufficient justification for the aggressive persistence with which the motor car is somehow introduced by a large section of the general Press into the head-lines which serve to cover a record of "smashes," among which the motoring ones may prove to be by no means the most disastrous. Railways, one must suppose, have had their day in this respect, and unless the accident be sufficiently blood-curdling it is apparently unfashionable now to give it even equal prominence with any mishap that occurs on the roads, whilst the smallest accident to a motor car is seized upon with avidity—an unenviable distinction which it would doubtless benefit the industry to be well rid of.

Referring to the bad accident on Grove Hill, Harrow, the absolute necessity of forcibly preventing the recurrence of such disasters has been clearly demonstrated to the authorities by the serious nature and number of those which have occurred at this spot in the past, but no especially stringent measures have as yet been taken in this direction, although the locality has strongly expressed itself in favour of some such action being taken.

It has been suggested that a policeman should be stationed on point duty at the top of Grove Hill in order to draw attention to the particular significance of the two danger-signs already in position. We are of the opinion that even if such a suggestion is not quite reasonable, a special "notice" of extreme danger to motorists should be erected in an obvious position on the top of this hill. We can pretend no sympathy for those who invariably "rush" all hills, and we strongly maintain that on every hill a driver should have his car absolutely in hand whether he sees danger or not. It is not on account of the extraordinary steepness or suddenness of this hill that we advocate the special warning sign, but principally because its chief danger is not an obvious one to a driver when descending the hill, but is due to the bad camber on the road which runs across the foot of the hill at right angles to it. It will, doubtless, be remembered that a fatal accident occurred on this particular spot five years ago, when the unfortunate Sewell was killed. Many comments were made in this and other journals at the time, and, doubtless that particular disaster was an object lesson to many manufacturers. Present-day cars are not likely, however, to give way in the manner that characterised that sad event, so that drivers now chiefly rely on themselves, and no one can reasonably ask more than to be warned of danger to be fairly sure of safely passing it. We would further remind motorists who may happen to be in that locality that the main road passes down Peterborough Hill, and not Grove Hill, despite the fact that the latter is apparently the more direct route to take.

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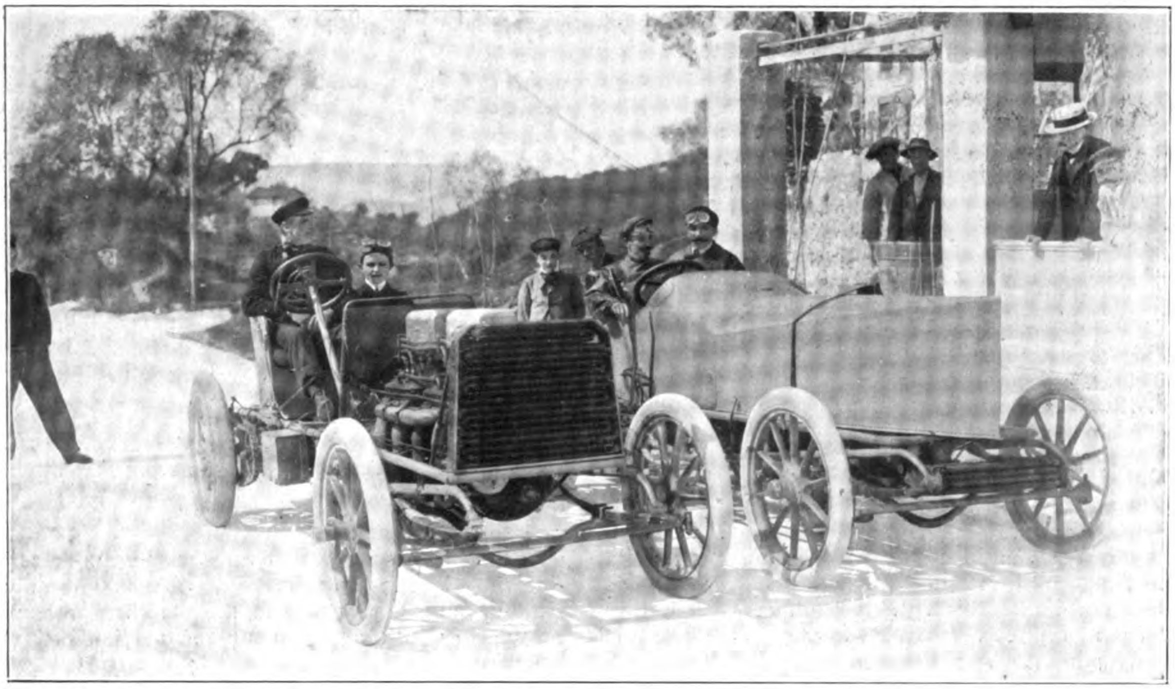
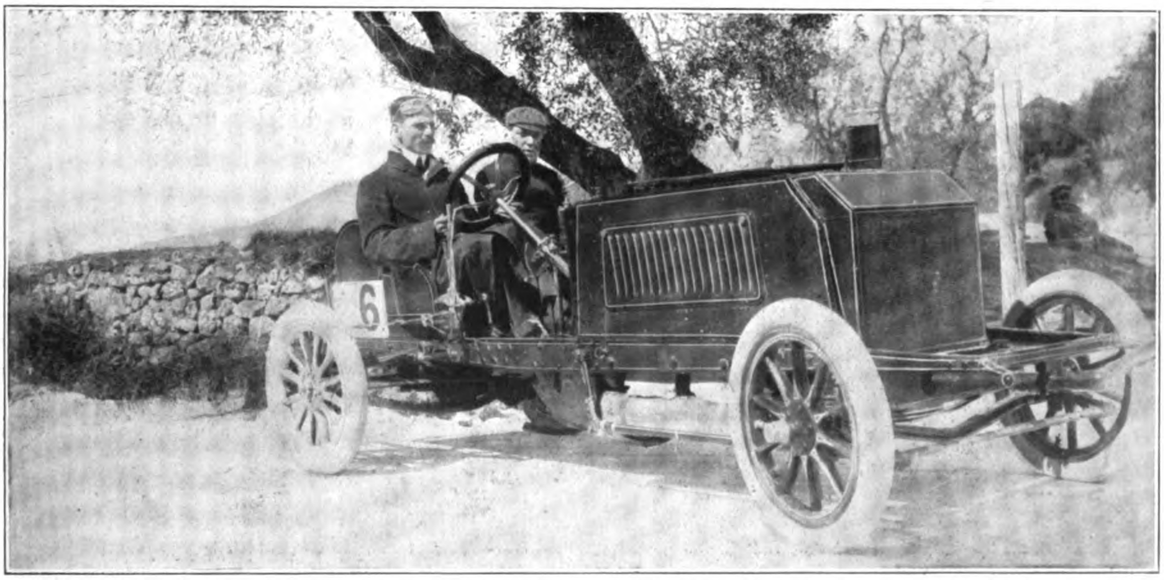
MR. ALFRED BIRD, the chairman of the A.C.G.B.I. Races Committee, Mr. C. D. Rose, M.P., and Mr. James Ochs, members of that committee, have this week crossed to the Isle of Man for the purpose of personally inspecting the course over which it is proposed to hold the Eliminating Trials for the Gordon-Bennett Race. The weighing-in and examination for the Trials will take place on Saturday week, April 16th, when in consequence the Club Motor House will be closed for that day.

NICE AUTOMOBILE WEEK.

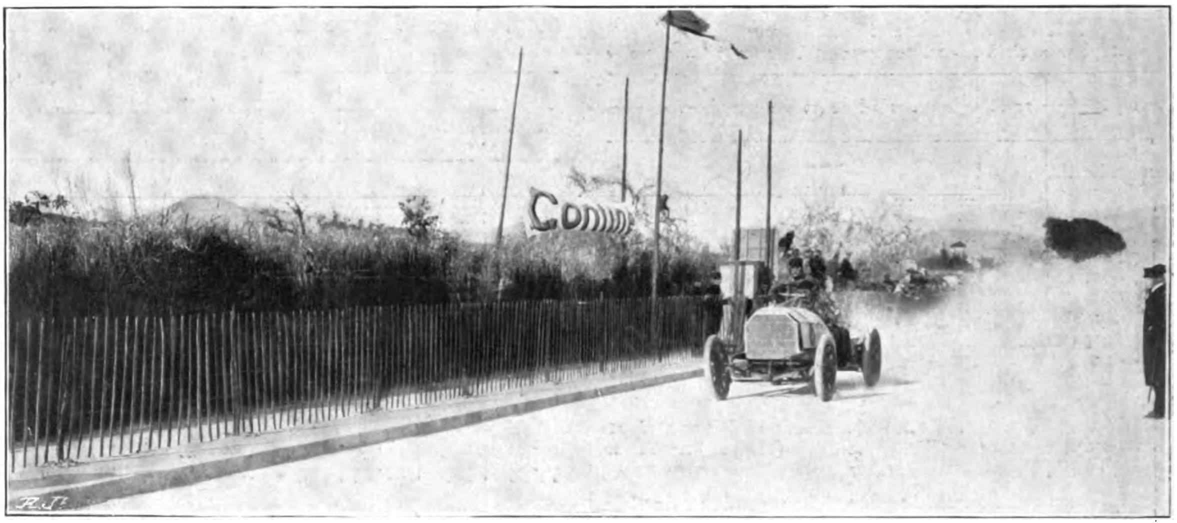


NICE AUTOMOBILE WEEK.—The Coupe de Caters. Duray and Rigolly on their Gobron-Brillie Racers with which they scored such an enormous success during the Nice Speed Events. Duray's Vehicle on the left of the picture is last year's Gobron-Brillie Racing Car, and is the property of Mr. Alexander Burton.

THE bad weather experienced on Sunday last week was the only reason for complaint against the Clerk of the Weather during the whole of this fixture, which, so far as the speed events on the land were concerned, finished on the 1st inst. When early morn dawned on the Thursday, activity was everywhere apparent in the town. Probably Nice has never been fuller of visitors than during last week, the exciting events of the automobile meeting attracting many thousands into the town who have hitherto been strangers to the district. The actual speed



NICE AUTOMOBILE WEEK.—Coupe de Caters. Mr. Mark Mayhew on his Napier Racer before starting for his turn up the Turbie Hill.

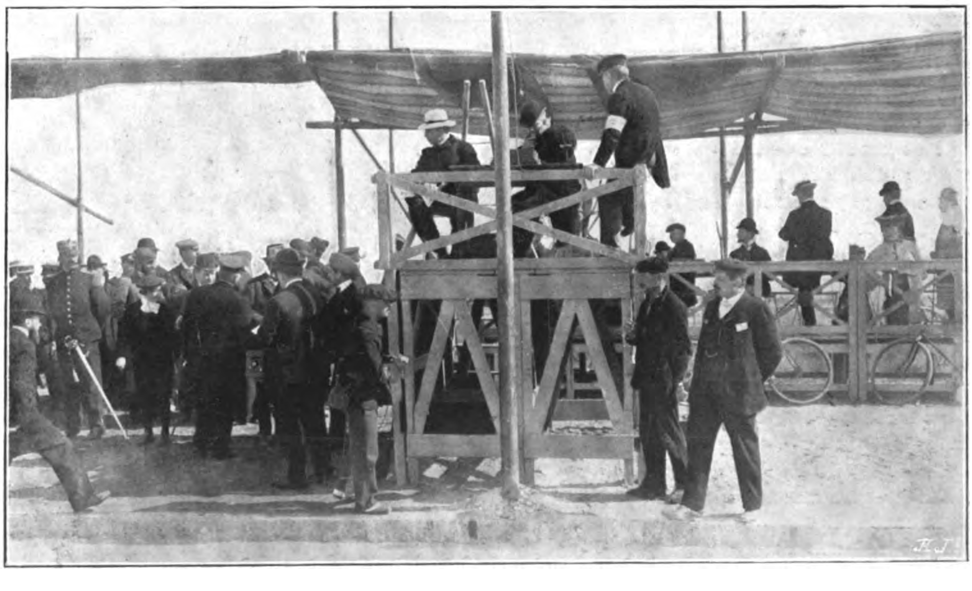


NICE AUTOMOBILE WEEK.—Werner on one of the Mercedes in the Mile Speed Race, covering that distance from a Standing Start in $57\frac{4}{5}$ secs.

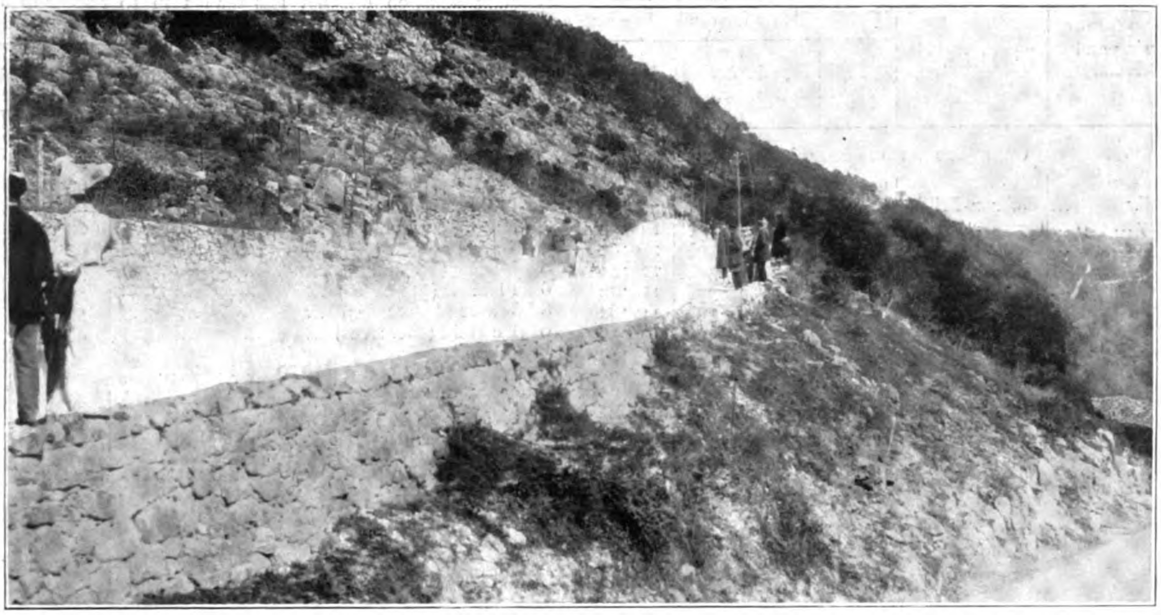
tests, as already mentioned, did not take place on the cemented part of the Promenade des Anglais, but on the extended portion of this famous road. Although this new portion of the road was somewhat rough and not altogether what could have been desired, at the same time under the circumstances of some new World's Records being established it would be but gracious to refrain from criticising too severely the work of the local authorities in laying down this otherwise splendid speedway. No doubt by next year matters will have improved, and Rigolly's marvellous speed of nearly 95 miles per hour may be considerably passed. Rigolly affirms that had it not been for the high wind blowing, in addition to the bumpy road, he would have done even better than his present world's record time.

Altogether the meeting has resulted in another triumph for the Gobron-Brillié make of cars, as not only were Rigolly and Duray first in the standing mile race, in which they both tied with the record time of $53\frac{3}{5}$ secs. (previous record, Braun, 1 min. $\frac{72}{100}$ secs. on a Mercedes), but in both of the Rothschild cups they were again placed in the same position at the head of the competitors. In the second Rothschild Cup Rigolly scored another record of 24 secs. for the flying kilometre, and in the third Rothschild Cup this marvellous driver put up the extraordinary World's Record of $23\frac{3}{5}$ secs. for the flying kilometre, equal to a speed of 94·7 m.p.h.

The world's record for a standing start mile was already in the hands of Rigolly with the Gobron-Brillié car on which Duray this year did so well, both of these



NICE AUTOMOBILE WEEK.—M. Tampier, the Official Timekeeper of the A.C. de France, in his "Tribune," at Nice, operating the Mors Electrical Timing Apparatus.



NICE AUTOMOBILE WEEK.—The stretch of 500 metres on the Turbie Road over which the Coupe de Caters was run this year. Braun, on his Mercedes Car, is just rounding the slight Bend in the Road.

"cracks" this year lowering the record for the flying kilometre by over 5 secs. The already marvellous record of Duray of $26\frac{2}{5}$ secs. for the kilometre was lowered both by Rigolly and Duray, their times, as recorded in our table, being respectively $23\frac{3}{5}$ secs. and $25\frac{1}{5}$ secs. The time last year of Hieronymus, when he won the first Rothschild Cup for the flying kilometre on a Mercedes in $31\frac{76}{100}$ secs., by comparison with the new record works out at quite an ordinary speed.

When Mr. Mark Mayhew first appeared upon the scene he was a centre of considerable interest, both with the public and the "cracks." Mr. Mayhew did well with his car, but we should greatly have liked to have seen the paces of *the* Napier racer which Mr. Edge proposes to drive in the Eliminating Trials for Great Britain. But that is another story. Although present in Nice, Mr. Edge had too recently recovered from his severe illness to attempt to drive personally, even had one of

NICE AUTOMOBILE WEEK.—One of the Motor Cyclists starting on the 500 Metres in the Coupe de Caters Race.

The Mile (1,609 Metres).—Standing start.

Classing and Drivers.	Make.	Time for the Standing Mile	Equals m.p.h.	Time for the Flying Kilom.	Equals k.p.h.
	Cars (600 *to* 1,000 *kilogs.*).				
		m. s.		secs.	
1 Rigolly ...	Gobron-Brillié	*0 53⅗	67·16	25⅗	140·62
1 Duray... ...	,,	*0 53⅗	67·16	26⅗	135·33
3 Werner ...	Mercedes ...	0 57⅘	62·28	30⅗	117·64
4 Jenatzy ...	,, ...	0 59⅕	60·81	30⅕	119·20
5 Fletcher ...	,, ...	1 1⅕	58·82	30⅖	118·42
6 Braun	,, ...	1 1⅘	58·25	30⅗	117·64
7 Mark Mayhew	Napier ...	1 3	57·14	32	112·50
8 Warden ...	Mercedes ...	1 3⅗	56·60	30⅗	117·64
	Light Cars.				
1 Durand ...	Mors	1 21⅗	44·11	44⅗	80·71
2 Neitham ...	Decauville ...	1 33⅕	38·62	48⅖	74·37
	Voiturettes.				
1 Deletang ...	Passy-Thellier	1 42	35·29	55⅗	64·74
	Motocycles.				
1 Tamagni ...	Marchand ...	1 15	48·00	43	83·72
	Motor Bicycles.				
1 Tamagni ...	Marchand ...	1 7⅖	53·41	38	94·73
2 Lamberjack ..	Griffon ...	1 9	52·17	39⅖	91·37
3 Seguy	,, ...	1 18⅗	45·80	50⅗	71·14
4 De Francia ...	,, ...	1 27	41·37	50	72·00
5 Ingilbert ...	Peugeot ...	1 31⅘	39·21	54⅗	65·93
6 Ancel	,, ...	1 39⅖	35·21	52⅖	68·70
7 Yourassoff ...	,, ...	1 42⅘	35·01	41⅗	86·53

The times for the flying kilom. are also given, but these do not affect the classing.

Second, "Coupe Henri de Rothschild."—1 kilom., with 600 metres flying start. (Reserved for cars, 650 to 1,000 kilogs., driven by explosion motors.) Holder, Hieronymus. Time, $31\frac{70}{100}$ secs.

Classing and Drivers.	Make.	Time. Flying Kilom.	Speed. k.p.h.	Speed. m.p.h.
		secs.		
1 Rigolly	Gobron-Brillié	*24	150·00	93·21
2 Duray	,,	26⅗	135·33	84·09
3 Mark Mayhew...	Napier ...	28⅗	125·87	78·21
4 Warden... ...	Mercedes ...	‡29⅖	122·44	76·08
4 Braun	,, ...	‡29⅖	122·44	76·08
4 Werner	,, ...	‡29⅖	122·44	76·08
7 Fletcher... ...	,, ...	29⅘	120·80	75·06

Third, "Coupe Henri de Rothschild."—1 kilom., with 600 metres flying start. (Reserved for cars, 650 to 1,000 kilogs., driven by explosion motors.)

1 Rigolly	Gobron-Brillié	†23⅗	152·54	94·70
2 Duray	,,	25⅕	142·85	88·76
3 Mark Mayhew...	Napier ...	27⅕	132·35	82·24
4 Braun	Mercedes ...	29	124·13	77·13
5 Werner	,, ...	29⅕	123·28	76·60
6 Jenatzy	,, ...	29⅗	121·62	75·57
7 Fletcher ...	,, ...	29⅘	120·80	75·06
8 Warden... ...	,, ...	30⅖	118·42	73·58

This cup takes the place of the first Rothschild cup, won for the third time last year by Leon Serpollet in 29·19 secs. (=123·29 kiloms. or 76·60 miles per hour) and therefore "lifted" permanently.

The "Coupe de Caters."—500 metres (= 546·81 yards), standing start, on hill not less than 1 in 10 rise. Open to all vehicles without restrictions as to motors, fuel, or weight.

Classing, Drivers, and Cars.	Time.	Speed.	
	secs.	k.p.h.	m.p.h.
1 Duray (Gobron-Brillié)	26	69·23	43·01
2 Rigolly (Gobron-Brillié)	27	66·91	41·57
3 Werner (Mercedes)	28	64·29	39·95
4 Braun (Mercedes)	28⅗	62·93	39·10
5 Mark Mayhew (Napier)	30	60·00	37·28
6 Jenatzy (Mercedes)	‡30⅕	59·60	37·03
6 Fletcher (Mercedes)	‡30⅕	59·60	37·03
8 Warden (Mercedes)	32⅗	55·21	34·30
9 De Cesti (Mercedes)	36⅗	49·18	30·56
Motor Bicycles.			
1 Tamagni (Marchand)...	41⅘	43·06	26·76
2 Ancel (Peugeot)	42	42·85	26·62

Instituted in 1902. Distance, 1 kilom. on Corniche Hill. Winner, L. Serpollet. Time, 59⅕ secs.

In 1903. Distance, 1 kilom. on Laffrey Hill. Winner, L. Rigolly, Time, 50⅕ secs.

the new cars been handy. Baron De Caters, as we anticipated, also refrained from taking any active part in the races.

The magnitude of the gathering may be partially realised from the fact that it is estimated that 1,500 cars were present for the races, whilst only one accident occurred—due to Princess Lubovinskra's car—to a little girl, who, it was admitted, was solely to blame for the mishap.

On Friday, April 1st, the Coupe de Caters was competed for over 500 metres of the steepest portion of the Corniche-Turbie road, the starting point being at the Quatre Chemins, where the gradient is 1 in 10. In this race, which is from a standing start, honours were secured by Duray over his companion, Rigolly, both driving their respective Gobron-Brillié cars, Duray coming in victor by 1 sec. A "dead heat" again occurred in this race between Fletcher and Jenatzy on Mercedes cars, 30⅕ secs. being recorded by both. It was the third year of the De Caters Cup, as we mentioned last week, it having been won over one kilometre on the Corniche road in 1902 by Serpollet, Louis Rigolly securing the trophy last year over a similar distance on the Laffrey Hill. Curiously, Duray, driving Rigolly's last year's Gobron-Brillié car, came in first this year on the 500 metre course, a fact which points to the more rapid starting powers of the 1903 type of Gobron-Brillié over the new 1904 model, driven by Rigolly. In so short a distance the importance of getting away smartly is well demonstrated.

The much delayed completion of the Motor Boat Exhibition at Monaco finally took place on the 30th ult., when Prince Albert of Monaco, in magnificent weather, formally opened this, the first Exhibition of its kind. The Prince, who drove up in a splendid automobile, was accompanied by his suite, and at once commenced a complete inspection of the sixty-one boats on view in the enclosure. He took the greatest interest in the various boats, making the keenest inquiries upon many small details, demonstrating his intimate knowledge of the sport. For a considerable time the Prince has been

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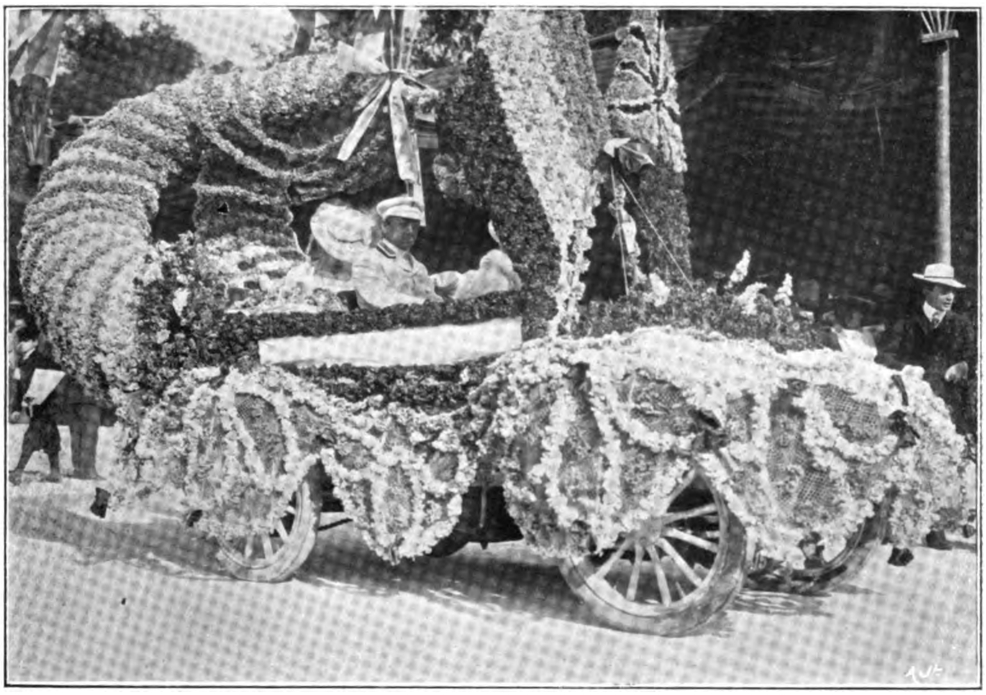
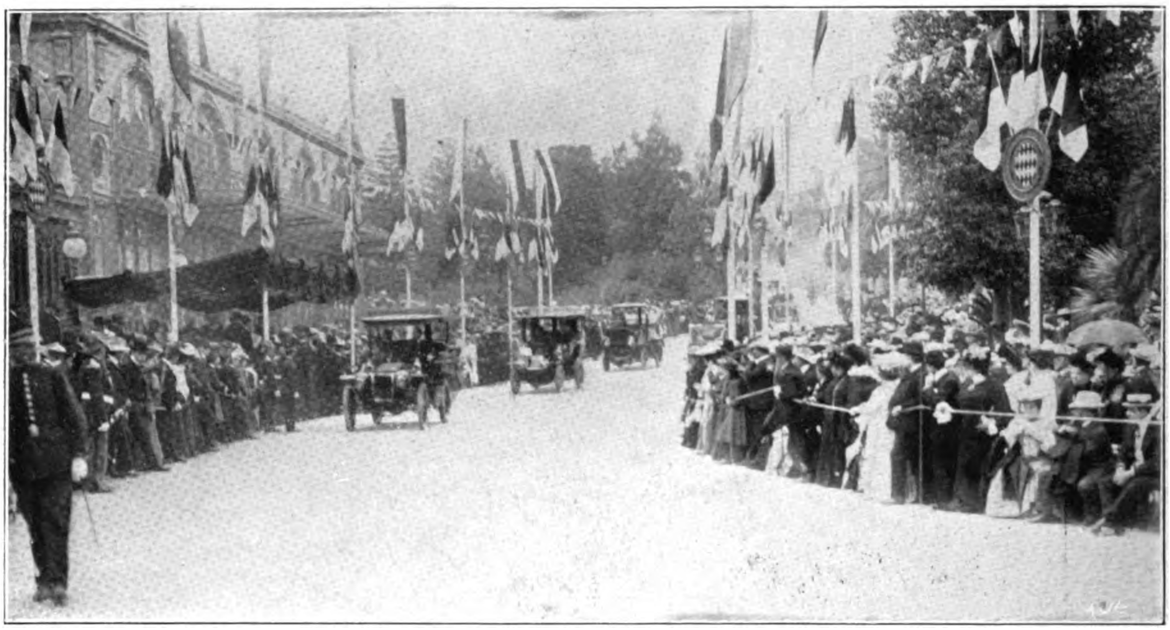
* Records. † World's record. ‡ Dead heat.



NICE AUTOMOBILE WEEK.—Mr. Walter Munroe's Winning Car at the Corso Fleuri, decorated to represent l'Entente Cordiale. The scheme of blending with flowers the National Colours of France and Great Britain, and depicting the Flags of the two Countries intertwined, was most perfectly carried out, and formed an exquisite design never before equalled even in Nice.

almost a fanatic upon all matters relating to marine navigation, and he has always been particularly interested in the application of light motors to boats. He was received by Mons. Camille Blanc, who, as President of the Organising Committee, has been mainly responsible for the success of the Show. Subsequently the Prince appointed Mons. Blanc an Officer of the Order of St. Charles, and his co-worker, Mons. H. F. Cabirau, a Chevalier of the same Order. The Exhibition was crowded from the earliest moment of opening to the public, amongst the gathering being Princes, Dukes, Barons, Counts, Generals, and other military officers, Judges, Consuls, high State officials, dignitaries of the Church, and members of almost every grade of Society, down to the professional motor boat engineer. Photographers were present almost by the legion, amateurs swamping the pro-

NICE AUTOMOBILE WEEK.—Mr. Warden and his Dog Chauffeur on their 90-h.p. Mercedes Car.



NICE AUTOMOBILE WEEK.—The Concours d'Élégance at Monte Carlo. Amongst the notabilities forming the Jury for this item were Prince Albert of Monaco and his Aide-de-Camp.

fessionals. Of the craft exhibited, every type and shape were to be seen—vessels built of wood and metal, for use on the river, and on the sea. Numberless types of propelling devices and motors were staged in one direction or another, rendering the Exhibition one of the greatest value to the large gathering of visitors, who appeared to take a practical interest in this rapidly-becoming fashionable pastime. One of the rules of the Exhibition permits, under certain conditions, of the exhibits being taken out of the enclosure for the purpose of trial trips on the water. On the Friday a very large number of the latest types of boat took advantage of this permission,

MONACO MOTOR BOAT MEETING.—Prince Albert of Monaco Inaugurates the Exhibition of Motor Boats. Prince Albert at the moment is taking note of the Motor Boat of the Société La Marguerite. This boat was the winner of the first day's race for Cruisers, covering 60 kiloms. in 3h. 22m. 23s.

MONACO MOTOR BOAT MEETING.—**Earl Dudley, the Viceroy of Ireland, visits the Exhibition.**

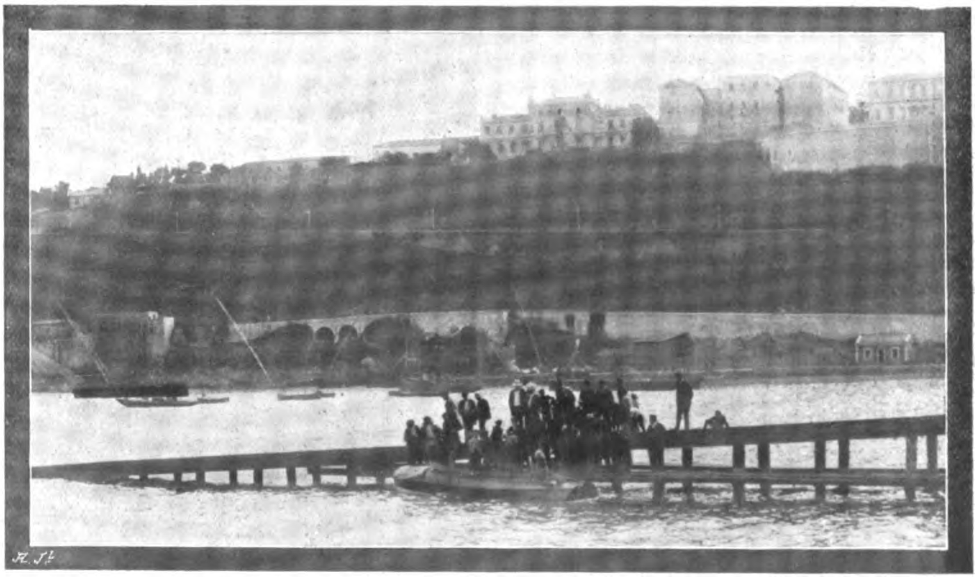
and were transferred, by way of the special slip prepared for this purpose, into Monaco Bay, including "Napier Minor," in the hands of Mr. S. F. Edge. An enormous crowd watched the evolutions of some of the more famous boats, and sportsmen were in all directions noting the points of each craft as it sped along, and reckoning up the chances which would be theirs in the races commencing this week. Originally these were fixed to commence on Monday last, but owing to the date of the Coupe de France clashing, at the request of the majority of the competitors the opening day was postponed until Tuesday, when the first event was timed to start at 8 a.m. The item on the day's programme was for racers up to 8 metres (26·24 feet), and cruisers up to 6·50 metres (21·32 feet), over a distance of about 150 kilometres for the former, and 60 kilometres for the latter, a maximum time of 10 hours being allowed to each. The course laid down for the racers is hexagonal in shape, giving $12\frac{1}{2}$ kilometres per round. This is traversed twelve times.

The results for the first day's racing were: *Racers.*—1st, La Rapée (4 hrs. 33 mins. $22\frac{1}{5}$ secs.); 2nd, Princesse Elizabeth (5 hrs. 18 mins. 40 secs.).

Cruisers. Course—Monaco, Nice, Antibes, and return—1st, Marguerite (3 hrs. 22 mins. 23 secs.); 2nd, Loodit (3 hrs. 22 mins. $23\frac{2}{5}$ secs.); 3rd, Allo I (4 hrs. 59 mins.; 39 secs.).

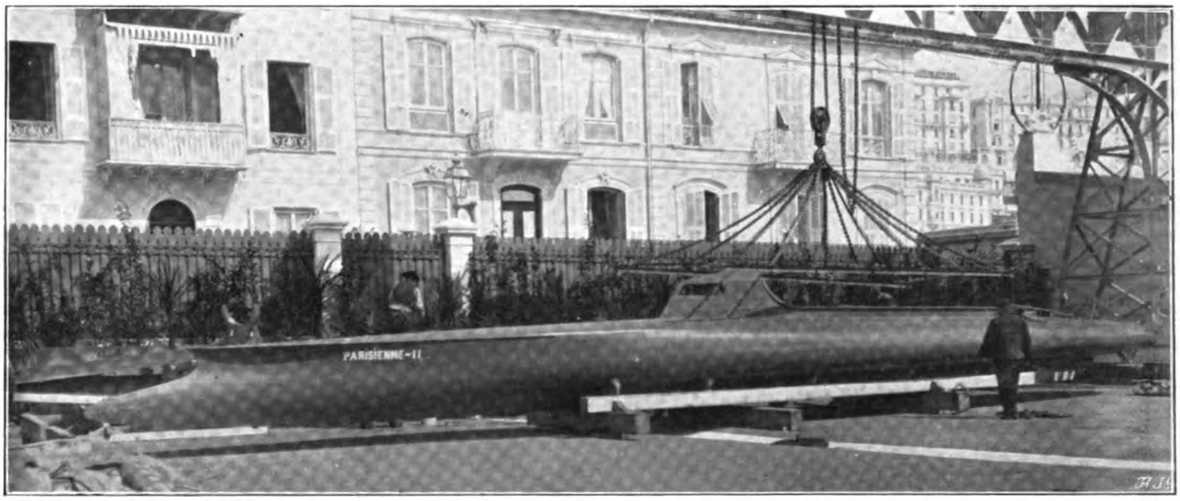
Seven racing boats and 6 cruisers started, and of these only 3 of the racers completed the full course, 3 abandoning the race after the first round, and the 4th giving up after the second round. In the cruiser class 5 completed the course of 60 kiloms., one only abandoning the race. On the eighth round the "Princesse Elizabeth" slowed down for a period of about a quarter of an hour, but in spite of this came in third in front of the second La Rapee, the time of the latter racer being 6 hrs. 3 min. $8\frac{1}{5}$ secs. Magnificent weather was experienced, and in the evening a banquet was held in the Club Salon of the International Sporting Club.

On each day subsequently, up to and including Monday next, races for the various classes of boats were on the programme to be run off, subject, in the case of the smaller boats, to weather permitting. The big Fiat boat only arrived on Monday, and may therefore be disqualified from racing as she will be unable to conform to the regulations requiring each competing boat to be exhibited for a minimum period before racing.



MONACO MOTOR BOAT MEETING.—**The "Slip" specially constructed for this important event.**

MONACO MOTOR BOAT EXHIBITION AND RACE MEETING.—A Contrast in Construction.



PARISIENNE II., 60 feet long, propelled by three motors, each giving about 70-h.p.

Reliability Trials for Motor Boats.—Owing to the expense and want of facilities for parking and mooring the boats in the neighbourhood of Southampton these Trials, it is proposed, should not extend for more than two days of ten hours each. Mr. Campbell Muir has offered to present a prize for the best motor using ordinary petroleum as fuel, part of the trials consisting of a test of fuel consumption. In awarding consumption prizes the relative safety and price of the fuel employed by the various boats will be considered, and marks awarded in arriving at the prize for reliability. It has been decided that the trials shall be confined to boats fitted with internal combustion motors, and that there shall be five classes, as under the Marine Motor Association Regulations, as follows:—

(1) Yachts' dinghies (clincher built), not exceeding 15 ft. over all.

(2) Yachts' launches (clincher or carvel), not exceeding 20 ft. over all.

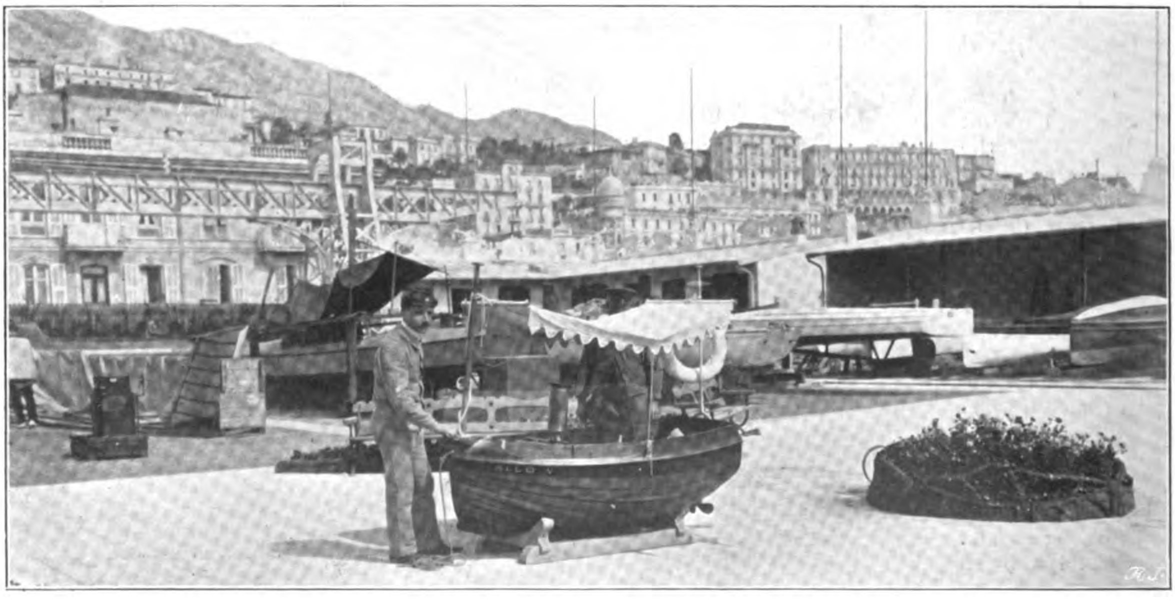
(3) Ditto, not exceeding 25 ft. over all.

(4) Ditto, not exceeding 30 ft. over all.

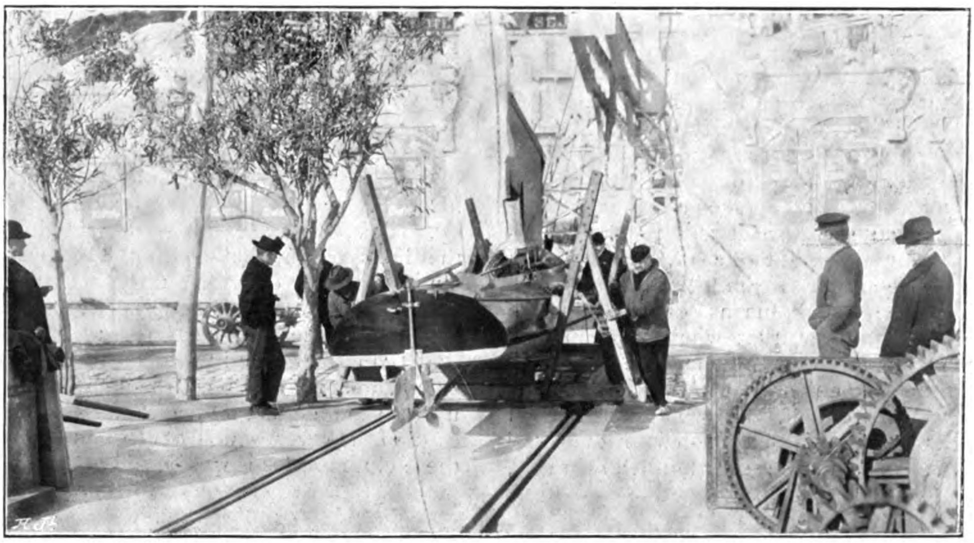
With the Marine Motor Association's restrictions of freeboard and beam.

(5) A class for "launches" above 30 ft., the term "launch" to be defined later.

A minimum of two entries in each class will be required or a boat entered must compete in the class above, and there must be a minimum of ten entries in all, or the Trials will not be held. The entrance fees will be as follows:—Class 1, £3; 2, £4; 3, £5; 4, £6;



ALLO V., 7 feet long, and fitted with a Two-Cylinder Engine giving about 13-h.p.



MONACO MOTOR BOAT MEETING.—La Rapée, another Type of Design. La Rapée being conveyed from the Exhibition to the "Slip" for a Turn in the Sea. La Rapée secured the prize in the Racers on the first day's race, covering the 150 kiloms. in 4h. 33m. 22⅕sec.

5, £7. In all probability the Admiralty formula in determining the allowance to be made per knot for deciding on the prize winners will be employed. The racing rules of the Marine Motor Association will be followed during the Trials.

Mr. J. A. Smith, who is also official measurer to the Yacht Club of France, has been appointed official measurer to the British club. A Marine Motor Sub-committee of the A.C.G.B.I., consisting of Mr. E. Campbell Muir, Mr. Bernard Redwood, and Mr. Linton Hope, has been appointed to draw up the full rules for these Reliability Trials.

FOR the Coupe Récopé, which is open to motor boats using heavy oil as fuel, a number of prizes will be forthcoming for competition. The French Minister of Marine has notified that the Government will give a gold medal and a silver-gilt medal to be allotted to the winning competitors. The A.C. of France has subscribed £200 towards the event and the A.C.G.B.I. £100. In addition, prizes will probably be given by the Dover Corporation and the Royal Cinque Ports Yacht Club. French torpedo boats are to be told off to accompany the motor boats in crossing over to Dover from Calais or Boulogne, from whichever it is finally decided that the start shall take place, and, if possible, the British Admiralty will allow some of the British torpedo craft to meet the racers half-way across the Channel. The date of the race is August 8th. The Coupe Récopé will be run for at the same time as a general race for motor boats over the same course, and another important cup is offered by M. Quinonès de Léon, entry for which is reserved for boats using denaturalised alcohol as fuel.

MOTOR boat races are to receive strong official recognition by the A.C. of Belgium. At the last meeting of the committee it was decided to allot four challenge cups, viz.:—(1) The Coupe de l'Escaut, to be run for annually from Antwerp to Flessingue and back, a distance of about 140 kiloms.; (2) the Coupe Littoral, to be run on a 50 kilom. course on the open sea, starting from and finishing at Ostend; (3) a Mile Speed Cup; and (4) a Kilometre Speed Cup. These will be awarded to the events organised by the Auto-Natique de Belgique.

Sport and Physical Culture.

THERE is but one Nietsche, and for a long time Sandow—with his School of Physical Culture and his magazine devoted to the same subject—might have been looked upon as his prophet. Now Sandow's periodical has, to some extent, a rival in a very admirable monthly magazine brought out by that literary athlete, Mr. C. B. Fry, and to be known as *C. B. Fry's Magazine*, the first number of which—for April—we have the pleasure to greet and wish good speed. Everything of the nature of sport comes within the corners of Mr. Fry's magazine, and this first number contains a highly eloquent and appreciative criticism of Mr. Watts' statue, "Physical Energy," by the editor himself, who shows us that he has in him, in addition to multifarious other accomplishments, the makings of a capable and original art critic. For automobilists the magazine contains an article which will come as a slight surprise. We have all known that Mr. Charles Jarrott is a brilliant and versatile speaker, and a raconteur of the first water, but in the article he contributes to *Fry's Magazine* he reaches a very high level of imaginative literary expression. Nowhere do we remember to have seen the idea that every engine and every motor car has a kind of spirit of its own so convincingly and artistically expressed. Mr. Jarrott's fame has hitherto been mostly won in the race, though he has also established a high reputation as an able and energetic man of business. Now it would seem as if he had determined to make journalists and men of letters look to their laurels. It is evident that he could be equally successful in that field if he chose seriously to adopt it.

Incidentally one cannot avoid noticing the rôle played by automobilism in this magazine, devoted to all kinds of sport. Not only is there Mr. Jarrott's article, but in three other separate papers the automobile, in one form or another, comes in for mention and appreciation.

THE LATEST DE DION-BOUTON PETROL CAR.—PART IV.

It will be noticed that one portion, Q^5, of the thread on the shaft, Q, is right-handed and that the other portion, Q^6, is left-handed. It should also be explained that screw threads are used instead of a plain toothed rack in order to provide an adjustment for the clutches. If one clutch alone were used it could be adjusted, relatively to the hand-lever operating it, by turning the shaft, Q, about its axis, and thus applying or freeing the clutch-shoes independently of the usual means of operating it. It will be noticed, however, that when two clutches are used in such a manner that the one expands whilst the other contracts, that any such turning of the shaft, Q, would tighten one clutch, but would slacken off the other. It is to avoid this that one-half of the screw has right-hand threads and the other left-hand threads, and with these clutches it is only necessary to turn the inner shaft, Q, round inside the second-motion-shaft, P, in order to tighten both clutches or in order to slacken them both simultaneously, the effect being to determine the amount of travel of the lever which operates them. The shaft, Q, is normally prevented from turning inside the shaft, P, by a catch, P^7 (Fig. 19), inside the brake-drum; the catch passes through a slot, P^8, in the shaft, P, and engages with a keyway, Q^4, in the shaft, Q. When it is desired to adjust the clutches it is only necessary to withdraw this catch, and the shaft, Q, can then be turned round by hand from the milled cap, Q^2, fitted to it for this purpose. The shaft, Q, of course, revolves with the shaft, P, and, therefore, it is necessary to fit a ball-thrust-bearing, Q^3, about its end, this bearing being connected in a similar manner with the hand-lever, Q^1, near the steering pillar.

These ingenious expanding clutches not only allow for simultaneous adjustment, but, should unequal wear occur in them, they enable this to be compensated for also. It will be realised that the only result of unequal wear would be to alter the path of the hand-lever, Q^1, so that its neutral position would be in a less convenient position, but that ultimately there would be a risk of both clutches being controlled, either by the right-handed screw-thread, Q^5, or by the left-handed thread, Q^6. This, however, can be corrected by disconnecting the links to the ball-bearing, Q^3, by contracting the clutches and by drawing out the shaft, Q^8, as far as it will come, so that the pinions, Q^9, of both clutches will then engage with the right-hand threaded portion, Q^5. The shaft can be screwed in or screwed out to the required extent, and may then be pushed back and again connected up with the handle, Q^1, as before. There is one precaution, however, which has to be taken when adjusting these clutches, for it will be seen that the junction point of the left and right-handed screw-threads only forms a continuous rack at two opposite points on the shaft, Q, and that therefore if the shaft were moved longitudinally when these points did not coincide with the teeth of the pinions, there would be a risk of missing one tooth on one pinion, with the result that the two shoes, Q^7, of the clutch would cease to be parallel, and that their friction surfaces would consequently not meet the surface of the drum properly. Care has been taken, however, to indicate (externally) the internal position of the screw-threads, so that it is only necessary to follow the instructions given by the Company, and to use a reasonable amount of common sense to avoid making this mistake.

Although we have given a somewhat lengthy description of this gear, in order to explain its construction and its action to the uninitiated, yet it will have been realised that it is by no means a complicated mechanism, nor one which is in any sense delicate. In practice, it is a very simple gear to manipulate, and is one that is ex-

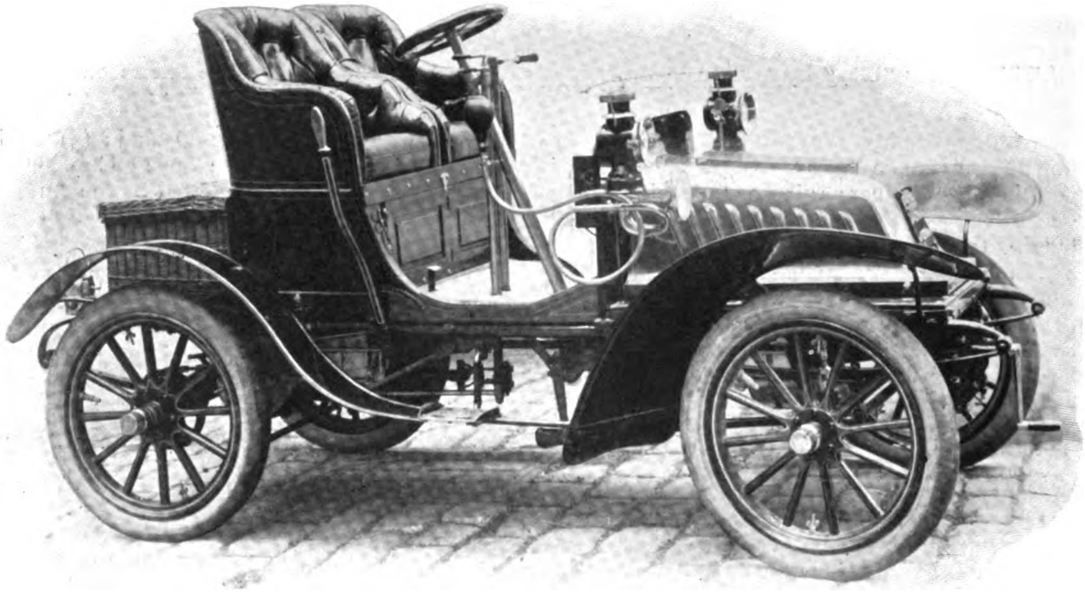


Fig. 23.—A 6-h.p. De Dion "Populaire" Voiturette.

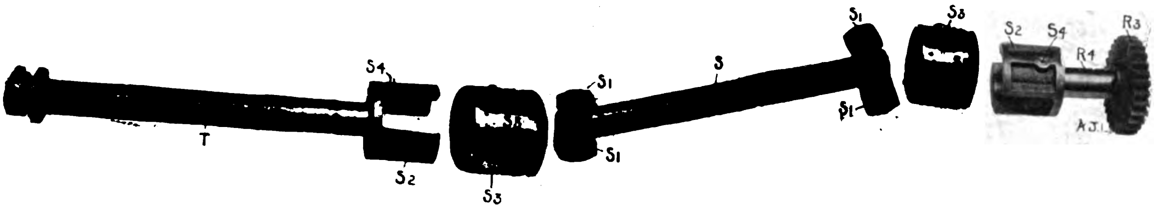


FIG. 20.—One of the Cardan-jointed Differential Shafts, together with its stub-axle, taken apart to show the construction.

tremely unlikely to be damaged by even the least experienced, or more careless, driver.

The change-speed-gear is fed with oil from the small hand pump (W) on the dash, and the oil is circulated in the gear-box by splashers, P^6, which revolve with the gear-wheels, and throw the oil so that it finds its way to all the bearing surfaces. The bevel-wheel, P^4, on the rear end of the second-motion-shaft meshes with a corresponding, larger, bevel fixed to the shell of the differential gear. The differential gear is of the spur-wheel type, and is completely enclosed inside the casing, R^2, which is bolted to the casing, R^1. The two differential shafts, R^4, are extremely short, being merely of sufficient length to obtain the necessary surface in the bearings provided for them in the casing, R^2.

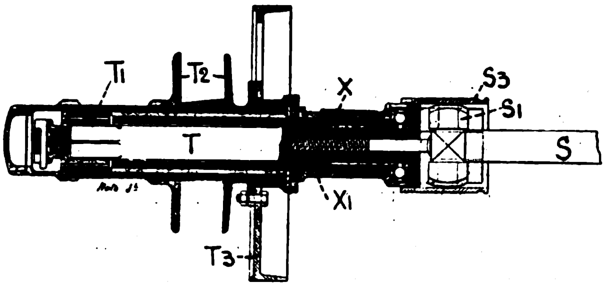


FIG. 21.—Cross-section of Stub-axle and Hub, together with Brake Drum and Cardan-joint.

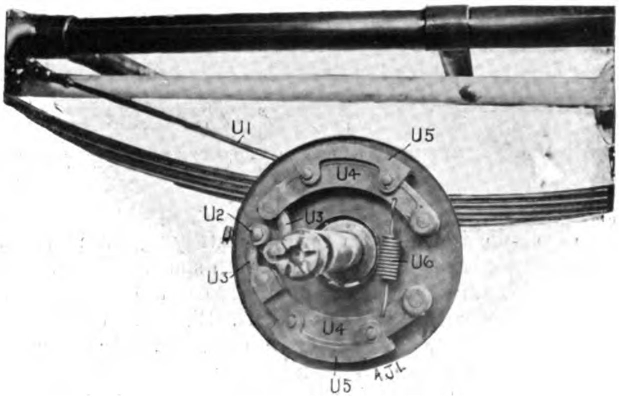


FIG. 22.—One of the Expanding Side-Brakes on the 10-h.p. De Dion Car—the Wheel and the Brake-Drum removed.

One of these shafts is seen in Fig. 20, which also shows the cardan shaft and the stub-axle that transmit the power from it to the road wheel. In Fig. 20 it will be noticed that one of the differential wheels, R^3, is shown fitted on the shaft, R^4, and that this shaft forms

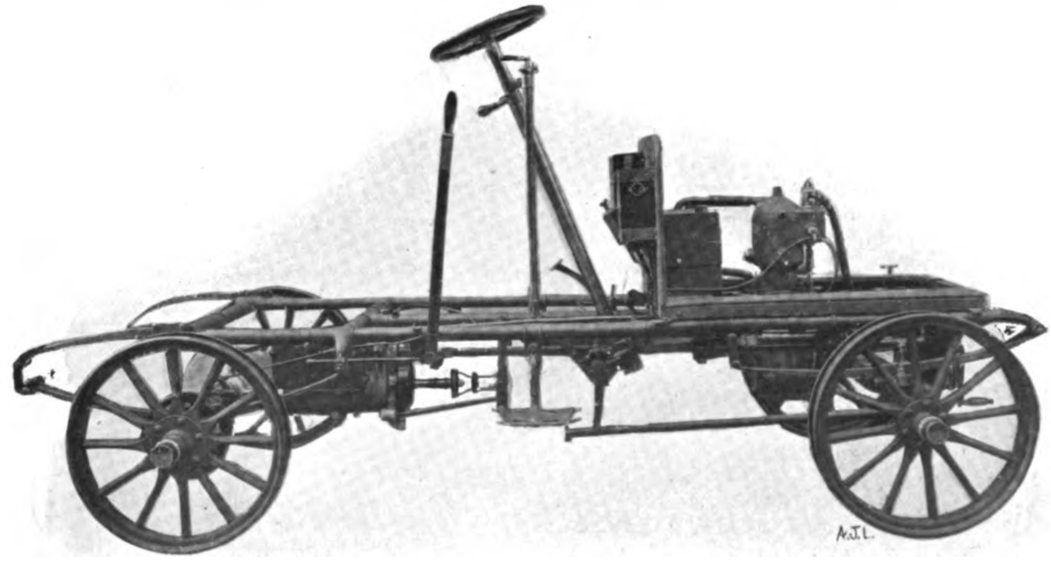


FIG. 24.—View of the 6-h.p. De Dion Chassis from the right-hand side.

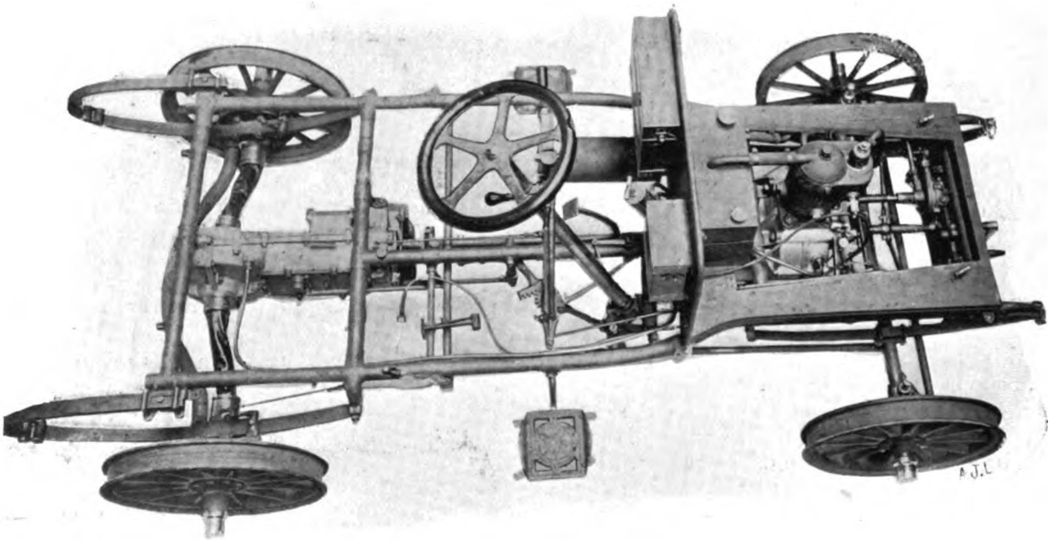


Fig. 25.—View of the 6-h.p. De Dion Chassis from above.

the claw-portion, S^2, of a cardan shaft lying immediately outside the casing, R^2. The cardan shaft, S, itself, is so shaped—with projecting pins at each end—that it carries the small square blocks, S^1, which fit into the claw-pieces, S^2. The blocks, S^1, are free to slide in the claws, S^2, and they are also free to turn about their pins. The necessary universal motion is thus obtained at each end of the shaft so that the power can be transmitted direct from the differential gear to the stub-axle, T, although the differential gear is mounted on the frame, and the frame is suspended on springs above the back-axle. The precise construction of the cardan joints is well shown in our illustration, and it will be noticed that the dust-proof caps, S^3, are held in place—after they have been slid over the joint—by small spring plungers, S^4, that are let into the claw pieces, S^2, so that they engage with holes, S^5, in the casings, S^3. The back-axle is perhaps best seen in Fig. 3, though we might also refer our readers to Fig. 26, as the axle on the 6-h.p. car there visible is of precisely similar design and is seen from beneath. The axle proper is formed by a bent steel tube, X, which connects the bearings for both wheels together rigidly, and carries brackets to which the side-springs are attached. One end of the axle is shown sectionally in Fig. 21, and here it will be seen that a sleeve, X^1, is fixed to it in such a way that the sleeve externally forms a bearing for the hub, T^1, of the road wheel, and internally a bearing for the

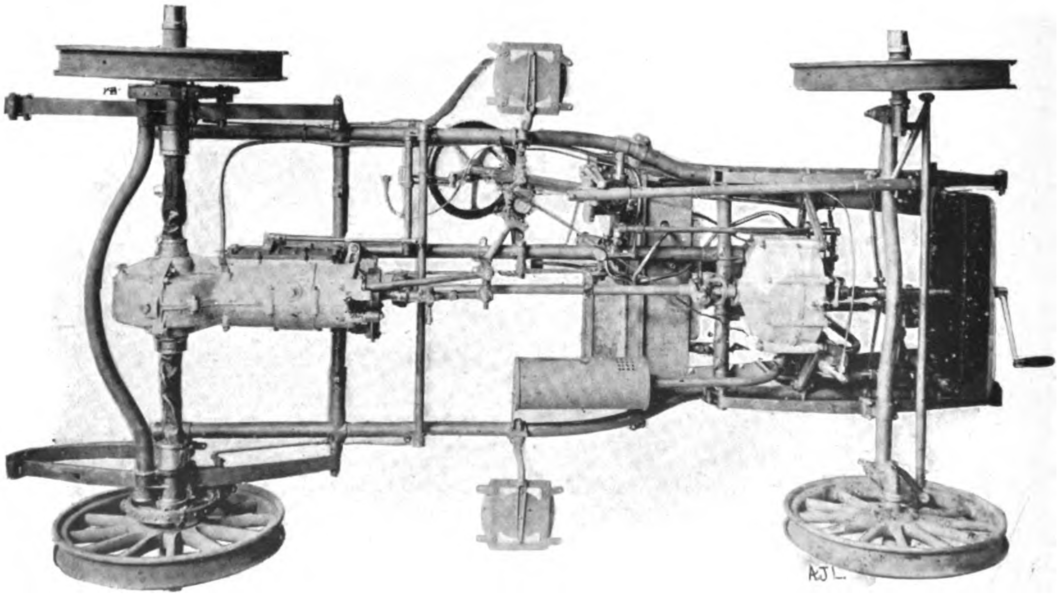


Fig. 26.—View of the 6-h.p. De Dion Chassis from beneath.

stub-axle, T. The weight of the vehicle is, therefore, not imposed upon the stub-axle, this axle merely taking the drive. In Fig. 21 it will be seen that a ball-thrust bearing is fitted, and that a helical spring inside the axle, T, tends to prevent end play of the cardan shaft, S. The hub, T^1, is of course built into the wheel by the flanges, T^2, which receive the spokes; and the brake-drum, T^3, is rigid with it.

A peculiar feature of this system, and of the arrangement of the stationary axle in conjunction with cardan joints, is that no radius rods are required to take the "torque." As a matter of fact no radius rods of any description are fitted, and the front ends of the side-springs are permitted to take the drive from the axle to the frame.

The foot-operated brake, which is applied by the pedal, V, is mounted, as we have seen, near the front end of the second-motion-shaft, P. It is of an extremely powerful character, but the most interesting part about it is that it can be adjusted with the very greatest ease, and without requiring any tools of any kind. It has two pivoted shoes arranged about the drum, P^5, and these are forced together when the brake pedal, V, is depressed. The brake is primarily adjusted by the small handle, V^1, seen in Figs. 14 and 15, and also by a similar locked handle, V^2, just above it. These handles can be reached from the side of the car, and the handle, V^1, is self-locking. There is, therefore, no excuse for a man having this brake improperly adjusted at any time, as it takes but a moment to do the necessary work, and no previous preparations of any kind are needed.

The side brakes acting direct on the hubs of each of the rear wheels are of the internal expanding type, and are simultaneously operated, as usual, by a side lever, U (Fig. 13). Their construction is well shown in Fig. 22, where it will be understood that the operating rod, U^1, is connected to a lever on the inner end of the spindle, U^2. When the spindle is rocked about its axis the links, U^3, force the pivoted levers, U^4, apart—against the action of the spring, U^6—and thus press the renewable metal shoes, U^5, outwards against the surrounding brake drum. All three brakes have metal-to-metal friction surfaces.

The thorough lubrication of all parts has been well provided for, and, as we have already said, the main oil supply is contained in a tank, G^3, forming part of the water tank, F^4, placed in front of the dash beneath the bonnet. This tank, G^3, has a capacity of about five quarts, and is connected with the hand-pump, W (Fig. 13), on the dash, by which oil can be forced by the pipes, W^1, to the change-speed-gear, to the differential gear, or to the crank-chamber. The separate reservoir, G^1, that normally feeds the engine, holds 2½ quarts, which is sufficient for running 300 miles. Independent lubricator fittings and grease cups are also fixed, throughout, upon all the minor moving parts on the car.

Most of the other features of this interesting vehicle will be rendered clear by our illustrations, so that we need not devote more of our space in dealing with them. The steering-gear is of the worm and segment irreversible type, the battery of dry cells and the coils are fixed to the dash, the petrol tank (which holds about 5 gallons) is arranged beneath the front seat in the body, and the exhaust-box, Y, lies across the frame at the back. The starting-handle fits direct on to the end of the crank-shaft, and passes through a socket formed for it in the radiator, as seen in Fig. 4.

The 12-h.p. vehicle is very similar to the 10-h.p. car which we have just described. Its two cylinders have a bore of 100 mm., and the stroke is 110 mm. Three speeds and a reverse are available on it, the form of gear employed being that of which we gave a sectional illustration on December 12th last, p. 1338; in this design all the gear wheels are always in mesh with one another. The weight of the car with a standard four-seated body is about 17 cwt. The chassis is made either with a wheel base of 6 ft. 10 ins. or with this increased to 8 ft. 1 in. The track is 4 ft. 2 ins., and the wheels are shod with 32 by 3½-in. tyres.

The smaller cars, which have single-cylinder engines, are of very similar general construction, and are equally well made. The 6-h.p. "Populaire," in particular, is a model that appeals to those requiring a small, light voiturette, so that the illustrations which we are now able to give of it will doubtless be acceptable to a large number of our readers. A complete car is shown in Fig. 23, and the chassis from three different points of view—from the right side, from above, and from beneath—are given in Figs. 24, 25, and 26. The tubular frame carries the engine and the gear as on the 10-h.p. vehicle, and the back-axle is designed in the same manner. There is no transverse spring at the back, but, instead of this, the rear ends of the semi-elliptic side-springs are carried by projecting leaf-springs, as seen in the illustrations.

The engine has its cylinder head designed in the same way as on the new 10-h.p. model; the cylinders have a bore of 90 mm., and the stroke is 110 mm. The engine runs at a normal speed of 1,600 revs. per min., and the flywheels are, of course, enclosed in the crank-chamber.

The exhaust-valve regulator is controlled both by the brake-pedal and by one of the hand-levers on the steering-pillar. The engine is lubricated from a hand-pump on the dash, and the same pump also serves for feeding oil to the transmission gear. Two speeds and a reverse are available, and two internal expanding clutches operate them; all three sets of gear-wheels remain in mesh at all times. The high gear is introduced by moving the hand lever on the steering pillar forward; the low gear by moving it backward; and the "reverse" by depressing a heel-pedal, and by pushing the hand lever forward. The car has a wheel base of 5 ft. 11 ins., a track of 3 ft. 10 ins., and (as a two-seater) weighs about 8 cwt. The main-frame is about 23 ins. above the ground, and is 33 ins. wide. Tyres of 28 by 3½ ins. are fitted to all four of the wooden wheels, and the machine is capable of travelling at any speed up to about 27 miles per hour. It will be noticed in our illustrations that the cardan shafts connecting the differential with the rear wheels are protected by leather covers between the metal dust-proof caps, and it will also be seen that in this small vehicle the exhaust-box lies beneath the floor on the left side.

Concerning the 8-h.p. vehicle it need only be said that it is a more powerful edition of the "Populaire." The gear is such that three forward speeds and a reverse are available, and it is so designed that all the spur-wheels remain in mesh except the intermediate "reverse" wheel. The cylinder has a bore of 100 mm., and the stroke is 120 mm., the wheels are shod with 30 by 3½-in. tyres, and the vehicle weighs about 13 cwt. with its standard four-seated body. The chassis is made either with a 6 ft. 2 in. or a 7 ft. 10½ in. wheel-base, and the track is 4 ft.

THE HUTTON PETROL CAR.

(*Continued from pages* 360 *and* 400.)

The Hutton Clutch.

The special features of the Hutton clutch are, that it is quite distinct from the flywheel, that special provision is made for retaining oil inside it, and that not only can the strength of the spring be easily adjusted, but an additional adjustment for wear is fitted. It differs, too, from most other expanding clutches, because the two parts of the expanding member move radially outwards, and their springiness is not relied upon in any way for making them fit against the drum. The complete clutch, together with the various separate parts, are shown in Fig. 12, and it is seen sectionally and in end elevation in Fig. 13. The clutch-drum, B, is made in two halves, which are bolted together, and are held in place to the crank-shaft by the same bolts that fix the flywheel to the flange on that shaft. The drum is so cast that an annular space is formed inside it for the oil to lie in, the oil being fed in regularly from the dash and finding its way on to the friction surfaces. The inside of the drum, instead of having a flat friction face, has several V grooves cut in it, and thus a very large surface is obtained, the expanding member, B^1, having corresponding ridges on its periphery to fit into the grooves. The expanding member, B^1, consists of two bronze half-rings, which are carried upon a square portion of the clutch-shaft, B^2, by the specially-shaped casting, B^3. The half-rings engage at their centres with slots in the casting, B^3, and are normally held inwards, up against it, by the helical springs, B^8, so that they do not then touch the drum, B. The half-rings, B^1, have wedge-shaped faces at each end, and these can be forced apart, parallel with one another, by wedges, B^6, which are mounted on the outer ends of radially-placed feed-screws, B^5. In Fig. 13 the feed-screws, B^5, are shown fitted into correspondingly-threaded and externally-spherical nuts, B^4, that are held in place in the casting, B^3, by small set screws, as seen, but in the clutch from which our photographs were taken, Fig. 12, this portion of the mechanism is somewhat differently designed, and is of more simple construction. In this latter case the feed-screw, B^5, screws into a nut, B^4, which is cylindrical externally, and the nut lies in the socket, B^{11}, which is rendered self-aligning in the required direction

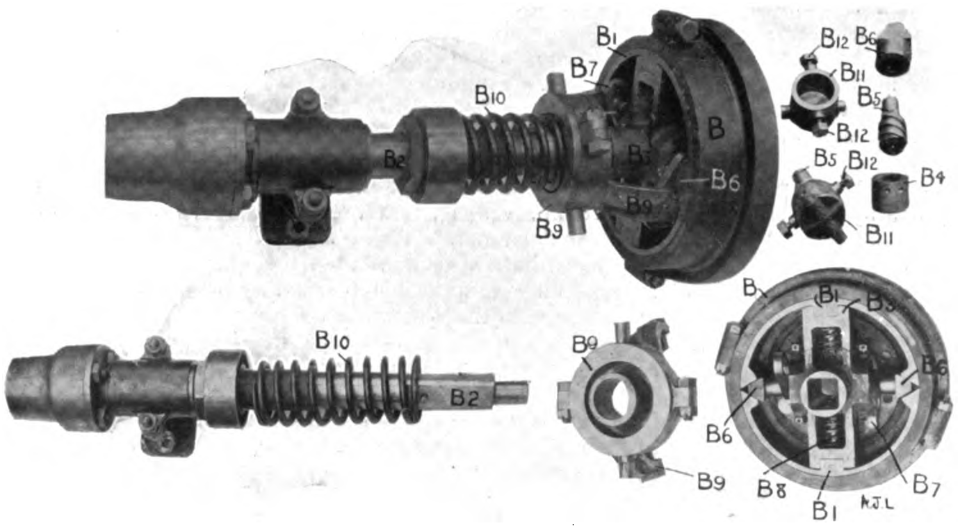


Fig. 12.—View of the Hutton Expanding Clutch—Complete and in Parts.

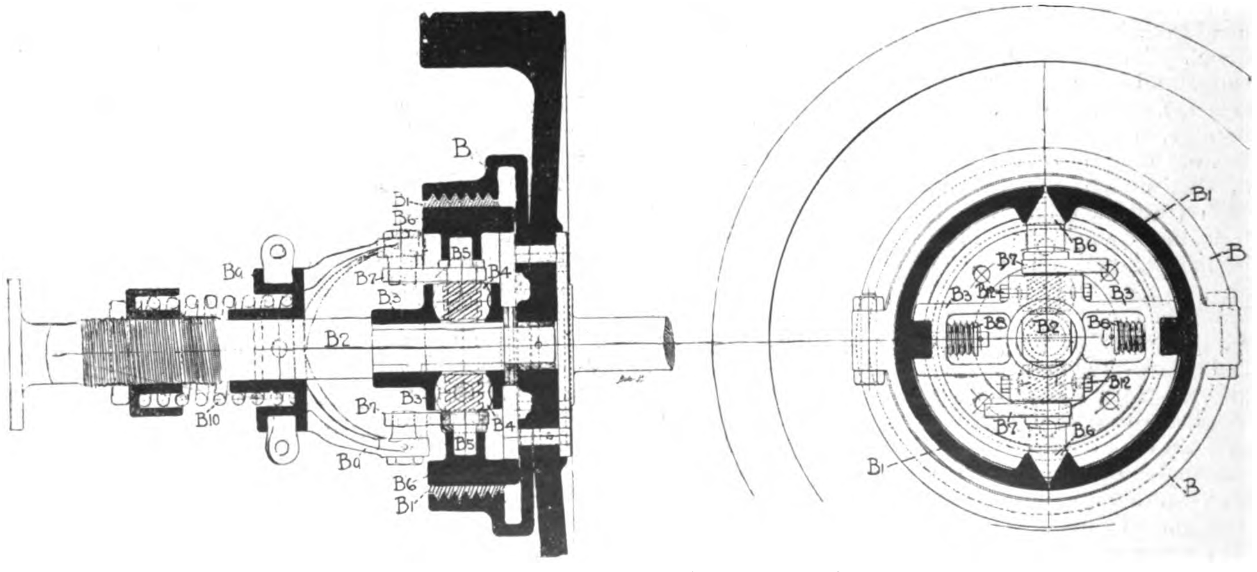


Fig. 13.—Section and End Elevation of the Hutton Main Clutch.

by being pivoted to the casting, B^3. The effect, however, in both cases is the same, for it is possible to adjust the position of the wedges by slackening the set-screws, B^{12}, and turning the nuts, B^4, round to the required extent before re-tightening them.

The feed-screws, B^5, have a square section between the thread and the circular ends which carry the wedges, B^6, and on these squares fit small projecting lever-arms, B^7, by which the feed-screws can be partially rotated to apply the clutch. The outer ends of these lever-arms, B^7, engage with the sliding-sleeve, B^9, which is, as usual, connected with the clutch-pedal, and for this purpose the sleeve also has projecting arms as seen in Fig. 13. When the sleeve, B^9, is forced along the shaft, B^2, by the adjustable spring, B^{10}, the feed-screws, B^5, are turned about their axis, causing them to travel outwardly from the nuts, B^4. and to force the wedges, B^6, in between the ends of the half-rings, B^1.

By this arrangement of parts, a very powerful clutch is obtained, and, as we have shown, all wear that takes place can be, from time to time, taken up. The clutch, too, can be very gradually applied, and the strength of the spring, which normally holds it in full engagement, can be readily adjusted.

The Hutton Brakes.

It has already been pointed out that the Barber gradually-variable change-speed-gear on the Hutton car essentially gives a free-wheel action to the vehicle, and therefore, the engine cannot at any time assist in retarding the car. Partly for this reason, unusually effective brakes are fitted, and both sets of these act direct upon the hubs of the rear-wheels, the one pair being of the internal expanding type, and the other of the external band type.

One of the wheels fitted with its brakes is shown in Fig. 14, and the precise construction of these, as also of the back axle and the hubs, is seen sectionally in Fig. 15. Both brakes act upon the same drum, C, which is secured to the hub by the same bolts that fix the chain-wheel in place. The internal brake is mechanically operated by a hand-lever placed beside the driver's seat in the car, and the external brake is applied by hydraulic control from one of the small hand-levers above the steering-wheel. The internal brake is constructed on much the same principle as the clutch that we have just described, but only one wedge is employed for expanding the internal member, C^1, and this internal member is made in one piece instead of two. The expanding ring, C^1, is supported at its centre immediately above the axle, E, by a bracket, E^1, which is fixed to the axle, and it is normally held down out of contact with the drum, C, by the helical spring, C^7, and the bolt, C^6. The ring itself has sufficient elasticity to allow for its expansion, and its ends are shaped off so that the wedge, C^2, can force them apart when it is pressed downwards. The wedge, C^2, the feed-screw, C^3, the nut, C^4, and the socket casting, C^8, are all arranged in precisely the same manner, as the corresponding parts, are in the clutch, and the screw, C^3, is provided with a projecting arm, C^5, as before. The arm, C^5, is normally held in its off position by a spring, C^9, and it is this arm which is compensatingly connected direct to the operating side-lever. It will be noticed that the friction surfaces for this internal brake are grooved in the same way as those in the clutch.

The external brake-band, D, is supported in a very similar manner above by the bracket, E^1, and it is normally held clear of the flat brake-drum by the action of the helical spring, D^2, acting upon the bolt, D^1. The two ends of the band, D, are drawn together to apply the brake by a small hydraulic ram, the cylinder, D^3, of which is hinged to the one end of a brake-band, and has its piston, D^7, connected to the other end. This ram is also shown sectionally in Fig. 15, where its action will be readily understood. The oil and the pressure can be admitted to it through the open port, D^4, and then the piston, D^7, is forced outwardly against the spring, D^8, this spring normally tending to separate the two ends of the brake-band, D. The piston is connected by the side-links, D^5, and by the rod, D^6, with the other end of the brake-band, and thus the band is tightened about the drum, E, when the valve admitting the oil to the cylinder is opened by the driver.

The small hand-lever which controls these hydraulic brakes is so arranged, above the steering wheel, that it is normally held in its neutral position by a spring, but that it can be moved from the central position in either direction. When moved one way it admits the oil to the cylinder, D^3, and when moved in the other direction it allows the oil to escape. A pressure of 350 lbs. per square inch is maintained on the oil, so that when the brake is fully applied it is capable of stopping the car within a very short distance at any time. It can, however, be applied gradually and to any desired extent, for, the oil being incompressible, the piston, D^7, can be made to assume any desired position by the driver. In practice, the small lever is intended to be operated by the thumb, and to be momentarily moved forward and allowed to fly back again until sufficient force is being exerted by the brake. Except for what small leakage may occur, the brakes will then remain "on" to the same extent until the lever is once more either moved forward to increase their pressure, or is moved back towards the driver to release them.

Both sets of brakes have their friction surfaces fed with oil, and they are, for this purpose, connected by pipes with a large multi-feed lubricator on the dashboard.

The Hutton Axles and Wheels.

Both the straight, nickel steel, tubular axles are fixed to the springs in precisely the same manner, by clips

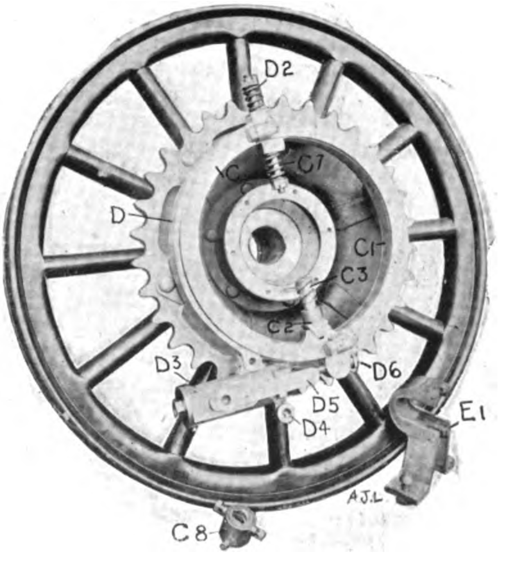


FIG. 14.—One of the Driving Wheels of the 20-h.p. Hutton Car, showing the Internal and External Brakes.

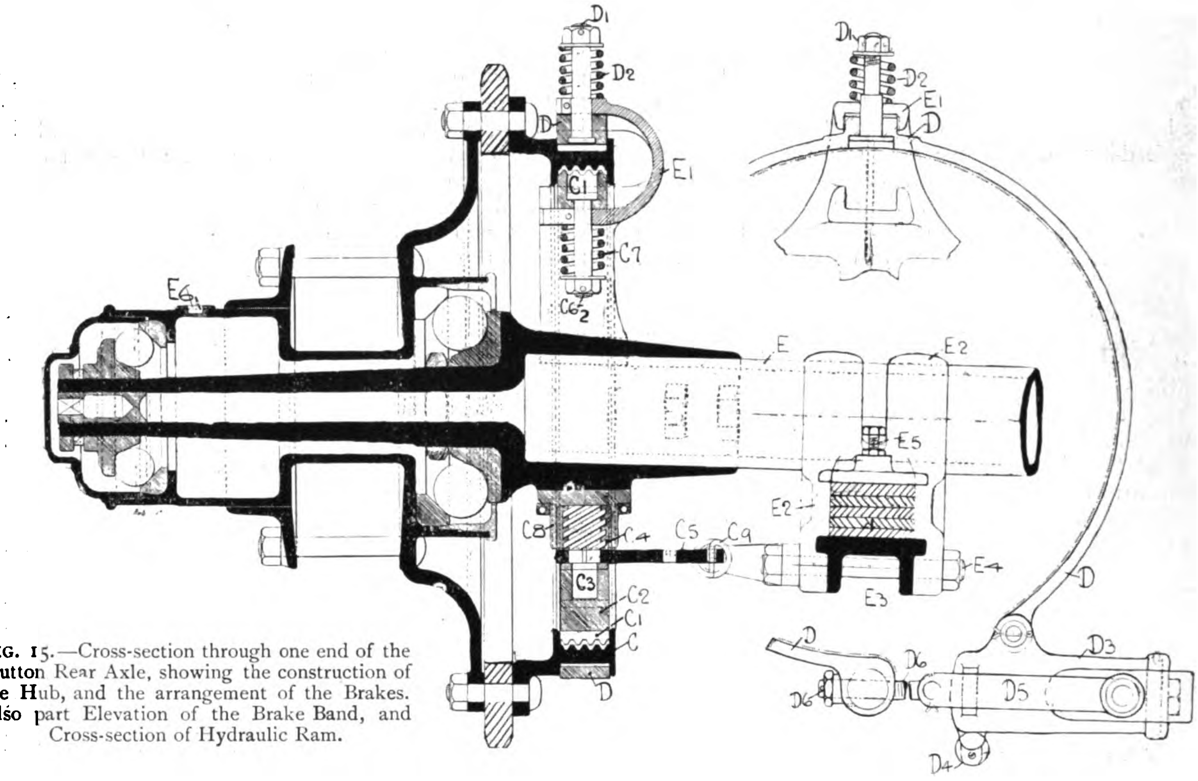
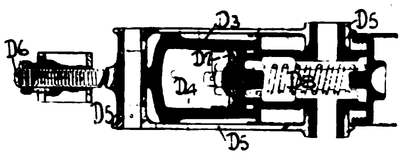


Fig. 15.—Cross-section through one end of the Hutton Rear Axle, showing the construction of the Hub, and the arrangement of the Brakes. Also part Elevation of the Brake Band, and Cross-section of Hydraulic Ram.

which are pinned to the axles, and hold the springs beneath them. One of the clips on the back axle is seen in Fig. 15, and two views of a front axle clip are given in Fig. 16—which is a longitudinal cross section of the front axle with its steering-head and front wheel hub. It will be noticed that the lower portion of the clip, E^2, form a kind of channel which bridges over the centre of the spring, and that a keeper, E^3, slides into grooves in each side of the clip, so that it lies close up beneath the spring. The keeper is held in place by the horizontal bolts, E^4, which draw the two parts of the clip together against it, and the spring is also forced down against the keeper by a pair of lock-nutted set-screws, E^5, which pass through projecting lugs forming a part of the clips. It should be pointed out that the weight of the vehicle presses the spring down upon the keeper, but that it does not come upon any of the bolts that hold the springs in place—as it does in most cars—and that the set-screws, E^5, merely prevent the spring from shifting lengthwise—apart from stopping any play up and down.



Unusually large ball-bearings are provided in all four hubs, the construction of which is so well shown in Figs. 15 and 16 that it is unnecessary to describe them at any length. It should, however, be pointed out that there is a three-point contact with each of the balls, and that two of the surfaces of the ball-races are tapered at such an angle that if prolonged they would meet at a common point upon the axis of the shaft. We would also draw attention to the fact that the hub itself forms a large oil retainer, and that a small screw cap, E^6, is provided for refilling it occasionally. The actual shafts upon which the wheels run are all hollow, and are thus

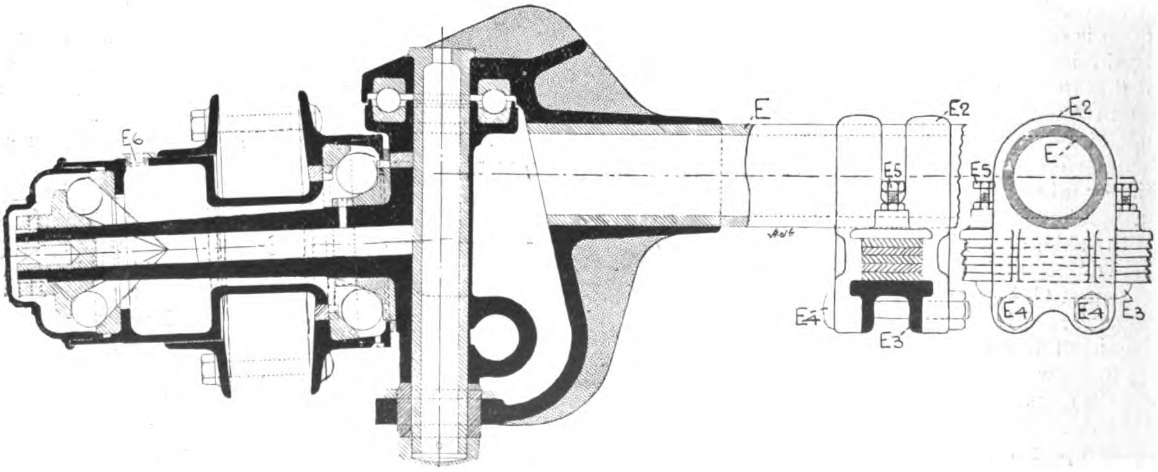


Fig. 16.—Section through one end of the Hutton Front Axle, showing Steering Head, Hub, and Spring Clips.

in keeping with the general design of the vehicle throughout in being very strong, but as light as possible; they are made from nickel-steel drop-forgings. A collection of some of the balls and ball-races used on the 20-h.p. car are shown in Fig. 17.

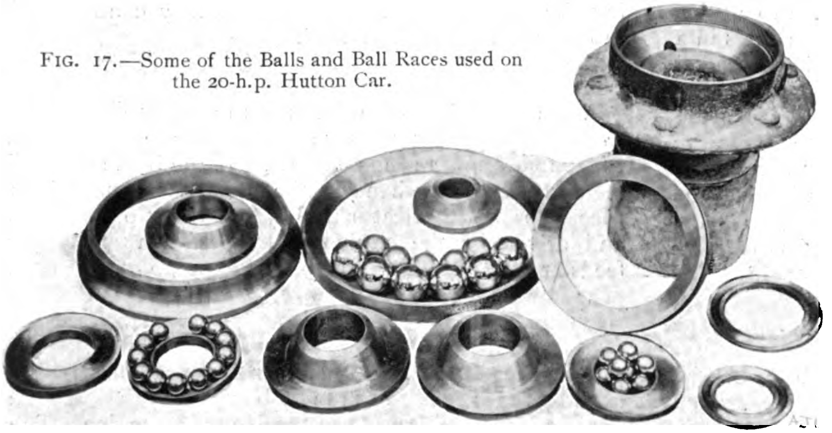


Fig. 17.—Some of the Balls and Ball Races used on the 20-h.p. Hutton Car.

The wheel shown in Fig. 14 is of the ordinary artillery type, but the Barber pattern, which is to be fitted to some of these cars, is shown from both sides in Fig. 18. In this wheel the wooden spokes are arranged tangentially in two sets at right angles to one another, so that the drive is taken by them in compression, and the strain is imposed in the direction of their length. The spokes are secured in place in very much the usual manner, the chief difference being that the inner ends where they join inside the hub are of a different shape. By this doubly-dished construction an extremely strong wheel is obtained.

The Hutton Steering Gear.

Special attention has been paid in the design of the entire steering mechanism to render it as frictionless as possible, and for this reason ball-bearings have been introduced for several of the parts. The steering-heads, as seen in Fig. 16, have one large ball-bearing to take the thrust above the stub axle, and this can be adjusted (as seen) from beneath. The central pin passing through the head is hollow, and the bearing surfaces are kept well lubricated from it. The head slopes outwardly and forwardly downwards, and in addition to this the stub axles slope slightly downwards outwardly, so as to splay the wheels.

The steering-gear itself is shown in Fig. 19, both com-

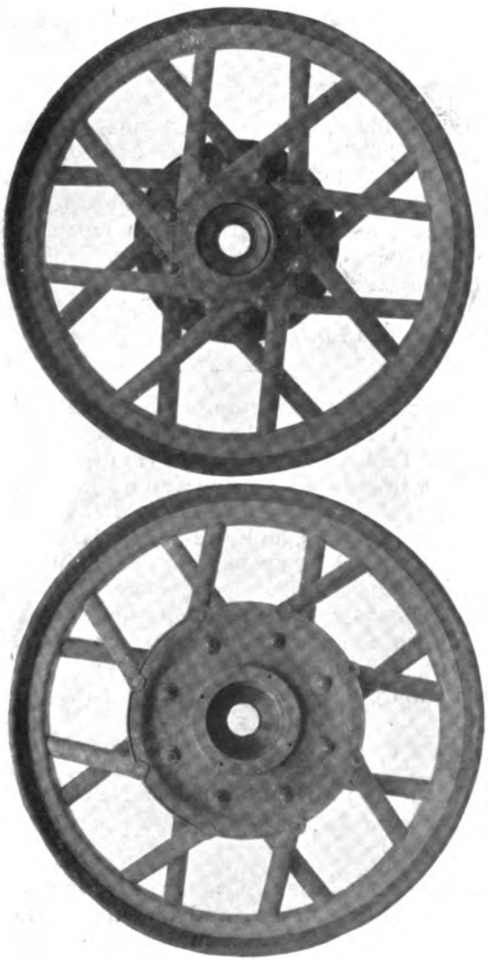


Fig. 18.—Two Views of a Barber Tangent-Spoke Artillery Wheel, built for the Hutton Petrol Car.

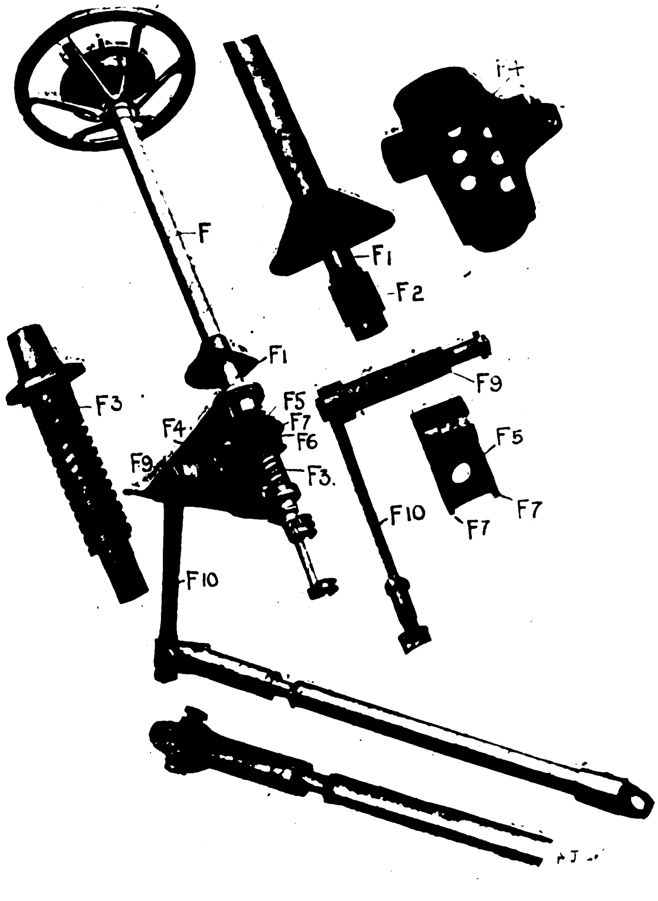


Fig. 19.—Views of the Hutton Steering Gear—Complete and in Parts.

plete and in parts, where it will be noticed that a triple-screw gives the necessary irreversible action between the road wheels and the steering wheel. The sloping pillar, F, itself is stationary, and the wheel is fixed to a tube, F^1, passing down inside it. This tube terminates in a jaw-coupling, F^2, which engages with the hollow threaded sleeve, F^3. The sleeve, F^3, is carried with ball-thrust-bearings at each end in the casting, F^4, by which the steering-gear is fixed to the chassis. Mounted upon the thread is a square nut, F^5, which is caused to travel up and down when the wheel is turned. Fitting into the sides of this nut—into circular recesses—are two discs, F^6, which have slots cut diagonally across them to receive lever arms, F^7, which project from a sleeve, F^8. The sleeve, F^8, fits upon a square on the horizontal shaft, F^9, to which the usual arm, F^{10}, is fixed, to act upon the steering heads in much the usual way.

As the steering-wheel is turned, the nut, F^5, is caused to travel up or down, carrying with it the discs, F^6, which can turn about their axis in it—thus rocking the shaft, F^9, by raising or lowering the lever-arms, F^7. No ball-and-socket joints are employed for connecting the steering-rods with the heads, but a spring-cushion device is introduced for taking up any backlash.

It will be noticed that there is a clear passage right down the centre of the steering-pillar. Inside this, pass three concentric tubes—connected with the three hand-levers above the wheel—by which the time of ignition can be varied, the change-speed-gear operated, and the hydraulic brakes applied. The three concentric tubes at their lower ends carry small grooved quadrants, as seen in Fig. 19, these quadrants being provided for connecting the tubes with the parts which they control. All tubes used are of nickel steel.

Lubrication.

All the most important parts of the mechanism on the car, including the various wearing surfaces on the engine, the clutch, the transmission gear, and the brakes, are fed regularly with oil, whenever the engine is running, by a special form of lubricator fitted just in front of the dash and driven by the engine. No less than twenty-four feeds are provided, and the oil is forced down into each of the twenty-four pipes in turn by the pressure which is maintained in the reservoir by the exhaust from the engine. The lubricator itself forms the oil tank, and in the base of it is mounted horizontally a long hollow cylinder that is held down in its bearings by the pressure in the tank, and is caused to revolve by the engine. The cylinder has holes of various size drilled through it, opposite to each of the feed pipes, and the holes form a spiral path along it. By this arrangement one hole at a time comes opposite an oil pipe, and thus each pipe gets a definite and independent feed once during each revolution of the cylinder. The lubricator is fitted in front of the dash instead of behind it, so that the oil shall be kept fluid by the heat inside the bonnet in cold weather.

(*To be continued.*)

REVIEWS OF BOOKS.

"The Motoring Annual and Motorists' Year Book (Illustrated) for 1904." 1st Edition. (*Motoring Illustrated*, 9, Arundel Street, Strand.)

A LARGE part of this well-got-up year book consists of an extremely comprehensive motoring "Who's Who?" in which nearly every well-known British and foreign motorist is mentioned, and their principal hobbies, pursuits, and opinions described. This portion of the work is supplemented by reproductions of photographs of a large number of them, in which ladies are particularly well represented. In addition the work contains full lists and particulars of all the principal automobile clubs in the country, a catalogue of races, records, and events connected with automobilism both at home and abroad, speed tables in kilometres and miles, descriptions of leading types of cars, a glossary of foreign motoring terms, and other information. It is altogether a work of reference, sure to be of use and interest to every automobilist, and its utility is considerably increased by a comprehensive index.

"The Dictionary of Motoring" By R. J. Mecredy. (Mecredy, Percy, and Co., Ltd., 34, Lower Abbey Street, Dublin, and Iliffe and Sons. 5*s*.)

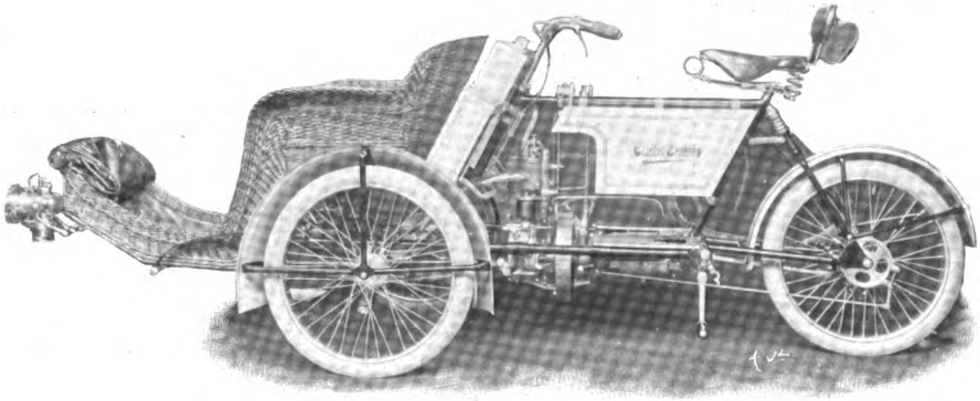
THOUGH this handy little work is a dictionary of motoring, in which nearly every term connected with the subject is alphabetically arranged, it is also a great deal more, for wherever advisable a thoroughly practicable, exhaustive, and well-illustrated article is introduced. An example in point is afforded by the article "Internal Combustion Engine," in which the principles of the petrol engine are clearly and lucidly explained so as to be intelligible to everybody, while the leading systems of ignition will be found fully described under the headings, "Ignition," "Coil," and "Battery." A feature of the work is its thoroughly practical character. Thus under "Roadside Troubles," we have seventy-five pages of the most practical hints and advice for circumventing almost every mishap that can occur while out, which cannot fail to prove highly valuable to all beginners and even to a good many whose novitiate is passed. The little book is neatly got up and brightly written.

A REMARKABLY complete automobile guide for Germany has been issued by the Continental Caoutchouc and Gutta Percha Company, of Hanover. It was published for the first time in 1903, and a second edition for 1904 has now made its appearance. This volume contains over 900 pages, and gives particulars of no less than 1,400 towns, with valuable information in regard to petrol stations, repair places, garages, &c. As an automobile guide for Germany the publication is invaluable, and the issue of the new edition is particularly welcome in view of the forthcoming Gordon-Bennett race, to be held at Homburg this year.

Motoring and Boating is the title of a new weekly illustrated journal, to be published in New York within the next few weeks.

LORD FRANCIS HOPE has recently purchased a 22-26 h.p. Daimler carriage, and Sir Alfred Hickman, Bart., M.P., has decided to secure a 28-36 h.p. carriage of the same make, specially built to his order.

MESSRS. CORDINGLEY & CO. S AGRICULTURAL HALL SHOW.



The "Garrard" Suspended Tricar.—This 3-wheel vehicle, which was seen at the Show, is fitted with a 5-h.p. single cylinder engine and a three-speed gear box of the sliding gear type. The drive to the back hub is by propeller shaft and worm gearing.

The Tyre Exhibits.

IN view of the representative character of the tyre exhibits at the Crystal Palace Show it was hardly to be expected that very many new things would be forthcoming at the Agricultural Hall Show. Manufacturers of tyres, however, are the last people to stand still and, despite the rapidity with which the Agricultural Hall Show followed on the previous one at the Crystal Palace, some of those makers who then exhibited their best, have now some additional attraction exhibited on their stands.

The Dunlop Company, it will be remembered, have for some time made a speciality of motor clothing as a suitable means of employing to advantage their surplus rubber. Examples of this rubber-proofed clothing in many forms were exhibited on this Company's stand, apart from their excellent show of Dunlop pneumatic tyres in all the standard sizes.

The Palmer Tyre Company, as at the Crystal Palace, showed the operation of constructing the Palmer cord tyre, an illustrated account of which will be found in our issue of November 28th, 1903. This is made in a form which is adapted to the use of a flange attachment. Since the Crystal Palace Show a modified form of flange has been introduced, an illustration of which is shown in Fig. 1. As will be seen from the section, the flanges are made to grip the felloe, which is reduced in width near the spokes to receive them, in such a way as to give additional support, while at the same time reducing the weight of the wheel.

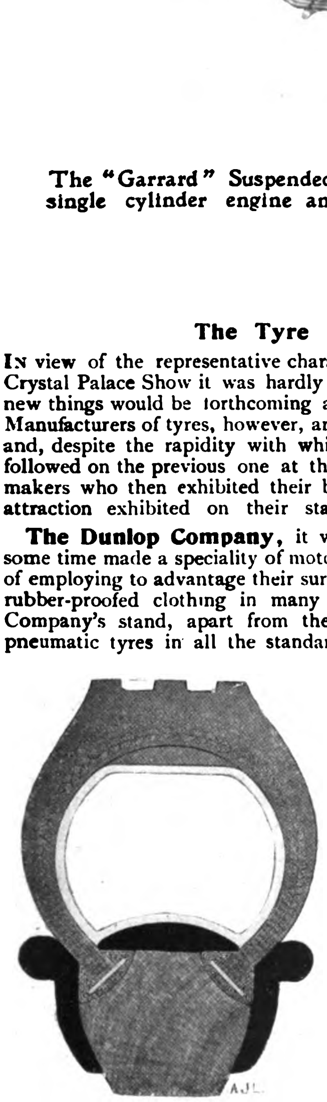


FIG. 1.—The Palmer Tyre, showing the new shape of the flanges.

The Collier Tyre Company exhibited a large selection of their well-known tyres, among which were those fitted with the improved fastening, which we illustrated and described in THE AUTOMOTOR JOURNAL of March 5th this year. This improvement, while it retains the use of the side wires, considerably facilitates the fitting of the tyre.

The exhibit of the **Clipper Tyre Company, Ltd.,** which included all sizes of their well-known makes of Clipper tyres, was a very complete one. Clipper, Clipper-Continental and Clipper-Michelin motor tyres were to be seen at this stand, while the Reflex-Clipper and Clipper-Continental motor cycle tyres were also shown, as well as a large assortment of tyre accessories.

The North British Rubber Company had a splendid exhibit of Clincher-Michelin tyres; two very useful new sizes have recently been added to the list of these, viz., 105 mm. and 135 mm., which form intermediate sizes between the 90, 120 and 150 mm., which formerly were in sequence. The 135 mm. tyre, which is the more recent of the two, is made in square treads only, while the 105 mm. is constructed in both sections. As is well known, all the Clincher-Michelin tyres are now made with both square and round treads in all sizes above 65 mm., with the exception of the 135 mm. and the 150 mm. Several of these tyres were again shown with small flat metal insertions in the tread, while there is also a new tyre in which projecting metal studs are vulcanised into the tread. British-made Clincher tyres were again shown in all sizes. An entirely new departure with this firm is the importation of a solid tyre, an illustration of which appears in Fig. 2. The "Ducasble," as this tyre is called, is hollowed out from the inside to receive a steel band, which is gripped by the security bolts in the manner shown in the illustration. It will be noticed that the steel band does not fill the hollow in the tyre, and great resiliency and cushioning is claimed to result from this construction. These tyres have been known in France for several years, and, although they are new to the English market, we understand that they are giving satisfaction on the public service cars already installed at Hastings, where they are fitted to duplex wheels, patterns of which were also exhibited at this stand. An interesting display of tyre accessories was again a feature of this stand, and among these mention must be made of the instantaneously detachable dust-caps, valve-hoods, and security bolt nuts. A very

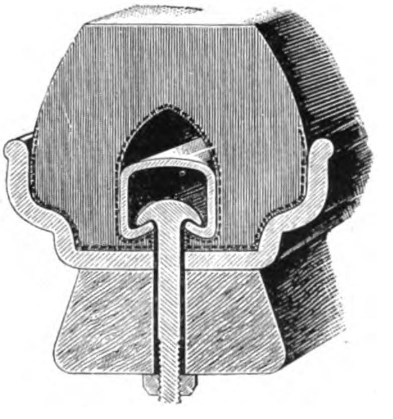


FIG. 2.—The "Ducasble" Hollow Motor Tyre of the North British Rubber Company, showing the central steel band and attachment of security bolts.

useful forked tyre lever, designed to facilitate the single-handed attachment of tyres, was also among these accessories. Users of the North British Rubber Company's tyres will welcome the addition of a motor clothing department. A very fine show of these garments, in which the seams are invariably vulcanised, made an additional attraction to this exhibit.

J. W. and T. Connolly, Ltd., were exhibiting the "Goodrich" tyres in a large variety of sizes, a particular speciality being made of the 5 in. and 6 in. sections for heavy vehicles. A sectional illustration of this "Goodrich" tyre (which was originally known as the "Firestone" tyre) is shown in Fig. 3, and the method of fastening is there clearly shown. Steel wires spaced 1 in. apart are passed transversely through the base of the tyre and well into the projecting beads at each side. Endless steel wires are sprung in place when the tyre is on the rim, and these tightly grip the beads above mentioned, the transverse steel wires giving the requisite stiffness.

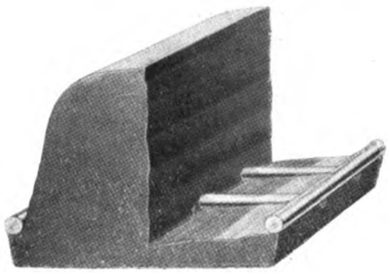


Fig. 3.—The "Goodrich" Solid Tyre. without rim, showing arrangement of wires.

The "De Nevers" grooved solid tyre, which we illustrated and described in connection with the Crystal Palace Show, in our issue of March 5th, 1904, was again on view, and attracted considerable attention at **Messrs. Liversidge and Son's** stand in the main hall.

An interesting departure in solid tyres is the "**Reilloc**" padded tyre, the invention of Mr. Arthur Collier. It will be seen from our illustration (Fig. 4) that this tyre is constructed in two parts. An outer cover of a similar construction to that of a pneumatic encloses an inner band of very soft rubber, A. It will be noticed that the principle of fastening embodies to a large extent the attachment of the "Collier" pneumatic tyres. The wires, which are clearly shown in the illustration, being retained in place between the iron rim on the circumference, and the flanges on either side, of the felloe. An adjustment for drawing the outer cover tight is provided for by a left and right-hand nut joining the wires. Besides the increased resiliency of this tyre over ordinary solids, a feature is also made of the fact that the renewal of the outer cover wastes less rubber than is the case with the renewal of solid tyres of the usual pattern, where so much is enclosed in the rim for the purpose of security. This design of tyre is also made in solid tyres of one piece, and for these the facility of attachment and the small amount of rubber used for the purpose are the principal claims.

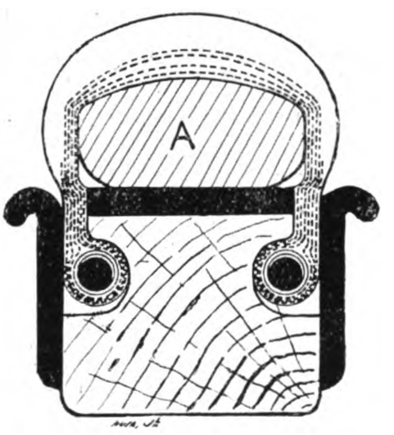


Fig. 4.—The "Reilloc" Padded Solid Tyre, showing the separate soft rubber interior, A, and the outer cover, which has a fabric foundation.

Another solid tyre which embodies an extremely positive attachment is the "**Williams**" solid tyre, in which a steel band passes through the length of the tyre, this band forming an endless ring by one end telescoping into the other. A screw anchor enables this band to be drawn tight, and at the same time compresses the rubber to a very considerable extent. A fully illustrated description of this tyre appeared in The Automotor Journal for April 26th, 1902.

A tyre which was shown for the first time is the "**Best**" solid tyre, exhibited by Messrs. Hopkinson and Sons and illustrated in section in Fig. 5. This tyre is introduced solely for use on very heavy vehicles. Our illustrations represent the positions of the tyre before and after it is tightened up on the rim. A steel rim, B, is shrunk over the felloe. The rim, B, is made concave on the outside. The tyre, A, is normally flat along the base, but tightening up the two flanges, C, by the bolts, E, squeezes the base of the tyre into the concave rim. The flanges are recessed, as shown in Fig. 5, in order to properly grip the edges of the tyre.

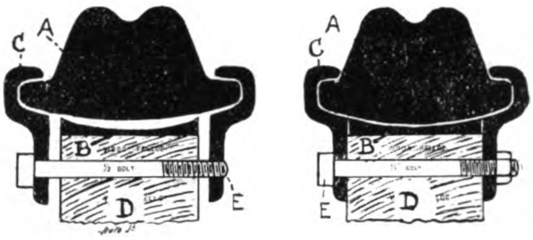


Fig. 5.—The "Best" Solid Tyre for heavy vehicles, showing the relative position before and after tightening up the side flanges.

Among the other exhibitors of pneumatic tyres must be mentioned the **Hyde Rubber Works, Limited**, who were again showing a comprehensive exhibit of their "Grappler" tyres; the **Seddon Motor Tyre Company**, whose tubeless pneumatic we illustrated and described in our issue of March 5th last; the South British Trading Company, Limited, who were showing the "**Fisk**" pneumatic tyres with both single and double tubes

The **Martin Pneumatic Tubeless Tyre**, which has been described in The Automotor Journal (June 28th, 1902), were showing several sizes, including a set of heavy tyres which were said to have already run some 7,000 miles, and still appeared to be in excellent condition.

A solid tyre of considerable interest, which was shown last year for the first time, is the **Peter Tyre**, which was illustrated and described very fully in The Automotor Journal of January 31st, 1903. This company were also showing their pneumatic tyres. For very heavy vehicles the **Gare Patent Tyre and Wheel Company** showed a combination tyre in which wooden blocks forming the tread are cushioned between rubber pads.

Numerous non-skidding devices were exhibited, notably the **Sampson Leather Tread**, which was shown by Capt. Theo Masui on the Germain stand, and which we illustrated and described in our issue of March 5th. Of the well-known **Parsons' Non-skid Chains**, which were fully described in The Automotor Journal of January 10th, 1903, there was a large exhibit. In the same hall was to be seen the **Imperator Non-skid** device, which took high honours at the recent Versailles Anti-skid Trials. In construction, it consists of a number of metal plates placed loosely across the tread and secured in place by link chains on either side of the wheel.

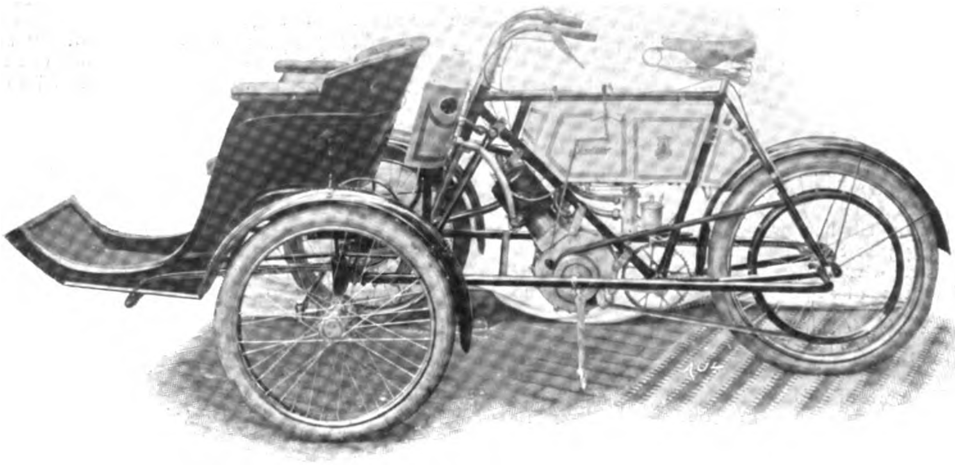
The Non-Skid and Non-Puncturable Pneumatic Tyre Company were showing their non-skid tread, which consists of a corrugated steel band built up of narrow transverse steel strips placed quite close together over the tyre. Another "Elastic" metal tread is the "**Joly,**" which consists of a large number of small steel studs set close together all over the tread of the tyre.

The "**Edwards**" **Non-Skid Band** was also again shown, this consisting of steel plates riveted at intervals to a chrome leather band, which is then vulcanised in place on the tyre.

Two interesting detachable leather covers for tyres were to be seen at the show. One, the "**Billet,**" shown by the Civil Service and Motor Cycle Agency, consists of a raw hide cover held in place by straps at intervals; while the other, the "**Crown,**" shown by W. Jenkinson and Co., is a cover built up of transverse strips of solid leather, which are all joined up at the ends to two narrow leather bands. The device is retained in place by lacing under the felloe. For both these devices, prevention from puncture and skidding is claimed, the "Billet" having steel studs as additional protection from the latter.

A "puncture proof" device, which is attached inside the cover instead of outside, is that shown by the Wilton-Cox Device Company. The "**Wilton-Cox**" band consists of a double thickness of chrome leather, the inner layer being only joined to the outer at the edges. The outer layer is secured to the interior of the outer cover, and it is claimed that punctures are prevented by the flexibility of the inner layer of leather, which is supposed to be only depressed inwards by the puncturing instrument.

A device in which the pneumatic element is retained below the rim proper is the **Wood's "Pneumatic Wheel,"** in which a hollow rim, shod with a solid rubber tyre, is allowed to ride on a pneumatic cushion contained in an inner felloe, to which the spokes are attached.



The "Excelsior" Motor Tricycle and Fore Carriage was shown at the Agricultural Hall Show by Messrs. Bayliss, Thomas and Co. A 4-h.p. inclined engine is fitted. The power is transmitted to the rear wheel by a V-belt. A combined tank and radiator is seen fitted behind the fore carriage.

CLUB DOINGS.

Hertfordshire Automobile Club.—The inaugural run of this club was held on March 26th, when about thirty members and friends joined in the outing. A start was made from St. Albans at 2.30, and the route taken was *viâ* Hatfield and Hertford to Stevenage, and from thence home, a stop being made both on the outward and return journey at the Red Lion, Hatfield. Amongst the members and guests were Messrs. Noel B. Kenealy (Chairman), E. Kenealy and Miss I. St. Leger Shervington, Mr. G. Malton and party, Mr. and Mrs. Barnet-Geake, Mr. W. D. Ross and the Misses Ross, Mr. E. J. Blain, Mr. and Mrs. W. G. James, Mr. and Mrs. J. T. Gardiner, the Rev. G. Bernard Gainsford, Dr. Gruggen, Mr. C. Wood, Mr. A. Hunt, Mr. W. Whittall (Hon. Sec.) with Mrs. Whittall.

Leicestershire Automobile Club.—In the list of members, just issued for 1904, a special caution is embodied enjoining upon all members to exercise when driving every possible care and consideration for other users of the road. Amongst the fixtures announced for the present season are the following runs:—April 9th, Ashby-de-la-Zouch; April 30th, Rugby, Dunchurch, and Daventry; May 14th, Oakham; May 25th, Rothwell; June 11th, Stratford-on-Avon; July 9th, Ashbourne (garden party); August 11th, Monastery; August 20th, Matlock; September 3rd, Lichfield; September 17th, Derby. The president of the club for the year is Mr. E. George Mawbey, M.I.C.E., and the vice-presidents are Col. Lionel Powell and Mr. T. C. King. Messrs. A. McAlpin and W. S. Hubbard are acting as honorary secretaries, the headquarters of the club being at the Bell Hotel, Leicester.

Norfolk Automobile and Launch Club.—About 60 members and friends attended last week the opening meet of the season of this club, when a run was made to Cromer. In the absence of Mr. George M. Chamberlin, the chairman of the club, Baron de Barreto, the vice-president, presided at the midday luncheon, and announced that the membership now amounted to 114. A delightful day was spent by those taking part in the outing, and amongst those present with their cars were the following:—Baron de Barreto, 20-h.p. and 10-h.p. Wolseley; Mr. H. L. Clark, 6-h.p. De Dion; Mr. J. Griffin, 12-h.p. Gladiator; Mr. W. B. Cubitt, 6-h.p. De Dion; Mr. W. W. R. Spelman, 6-h.p. De Dion; Mr. H. Williams, 4½-h.p. De Dion; Mr. H. Chamberlin, 12-h.p. Brooke; Mr. H. W. Egerton, 6-h.p. De Dion; Major A. V. St. John White, 6½-h.p. Gladiator; Mr. J. W. Brooke, 12-h.p. Brooke; Mr. W. Maudesley Brooke, 12-h.p. Brooke; Mr. C. de F. Clarke, 10-h.p. Daimler; Mr. P. Norgate, 6-h.p. De Dion; Mr. C. H. A. Lock, 6-h.p. De Dion; Mr. J. M. C. Ray, 8-h.p. Wolseley; Mr. J. N. R. Ray, 5-h.p. Benz; Mr. T. Bradley, 7-h.p. Daimler; Mr. G. W. Base, 6-h.p. Pick; Mr. E. Estcourt, 14-h.p. Brooke; Mr. J. W. Howlett, Ariel tricycle.

Nottinghamshire Automobile Club.—The second hill climb of this club is announced for May 14th. There will be two classes, *firstly* for standard touring cars the property of club members, which must carry their full complement of passengers. *Secondly*, for cars of any type or seating capacity either the property of club members or friends, such friends to be introduced by two members of the club. The winner of the first event will be for the most meritorious performance, and of the second the one doing the fastest time. The winner in each section to receive the club medal (not badge).

Applications for the secretaryship of the Cycle Engineers' Institute (which doubtless our readers remember will soon be known as "The Automobile and Cycle Engineers' Institute") were duly considered by the Council on March 31st, but no definite appointment was made, and the matter will be decided at their next meeting, to be held on April 14th.

This will give an opportunity for receiving further applications, which should be addressed to the president, Mr. A. S. Hill, Bale Street, Coventry.

The Lincolnshire Automobile Club and the Southern Motor Club have joined the Motor Union.

When calling attention in one of our short leading paragraphs last week to the very valuable paper on "Alcohol as a Motive Power," which was read by Dr. W. R. Ormandy, D.Sc., before the Automobile Club, we made it appear that the author spoke of the Chairman of his Company—Messrs. Crossfield and Sons, Limited—as being the high authority to whom he referred concerning the opinion expressed with regard to the probable increase in price and decrease in quality of petroleum in the future. Dr. Ormandy, however, informs us that when speaking of "my Chairman," he was referring to Dr. Boverton Redwood, F.R.S., who occupied the chair at the meeting. By an inadvertence we referred to Dr. Ormandy as "Professor" Ormandy. Dr. Ormandy informs us that he has in the past so actively called attention to the misuse of the word "Professor," and has so strongly given it as his opinion that it should be entirely confined to the holder of a Chair at a University, that he is desirous that we should correct the use by us of this prefix.

Under the agreement with the A.C.G.B.I., in connection with the Purley racing track, if work has not been commenced by April 12th, the arrangements come to an end. The option has now been extended for three months from that date.

ALCOHOL AS A MOTIVE POWER.*

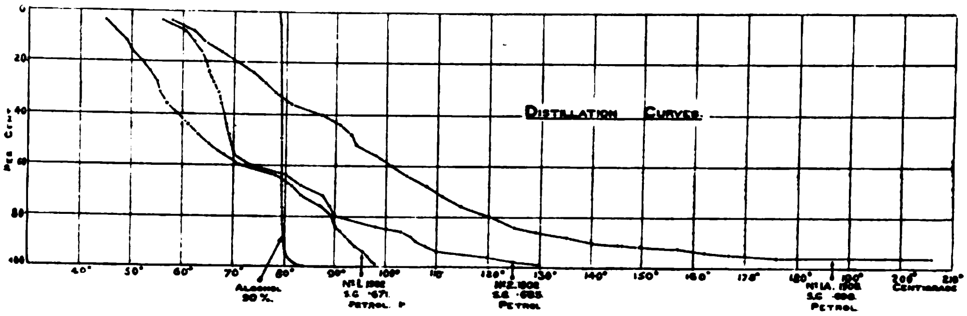
(*Concluded.*)

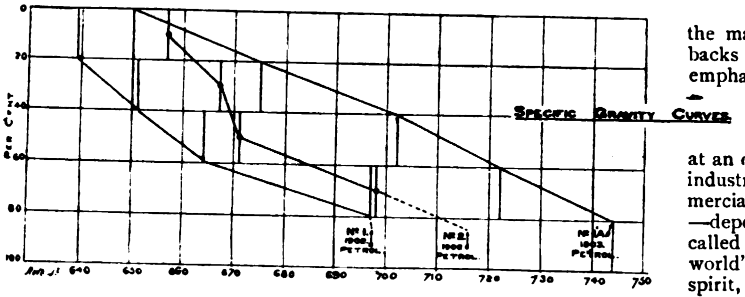
By W. R. Ormandy, D.Sc., of Messrs. J. Crosfield and Sons, Soap and Chemical Manufacturers, Warrington.

The temperature of the water employed in the cooling jacket plays a considerable rôle in the efficiency of spirit-driven engines. Very cold walls have the effect of condensing the fuel and leaving a poor mixture. It has proved impossible to run some alcohol motors with their water jackets supplied at a temperature of 0 deg. C. Mr. Fehrmann showed that the amount of alcohol required in some cases to drive a motor on half load was 100 per cent. more when the water in the cooling jacket was kept at about 15 deg. C. than when the jacket was kept at 100 deg. C. All tests of fuel consumption which do not take this into account will be of little or no scientific value.

A further interesting point brought out during the trials of the ten motors was the influence of varying strength of mixture on the consumption.

In concluding this part of his subject, Dr. Ormandy laid a good deal of stress on the many respects in which alcohol is superior to petrol as a fuel, saying that on full load—combustion being practically complete—the exhaust is odourless (or nearly so), that—being less inflammable—it is safer, that its storage and carriage are subject to less stringent regulations, and that it is more pleasant to handle. He quoted the experience of the Experimental Fermentation Institute, of Berlin, to disprove statements which have been made as to the deleterious effects of alcohol on the cylinders and valves of engines, and said that in no case had they observed any signs of acids having acted upon them. With regard to homogeneousness, he drew special attention to to the curves which he showed—these having been prepared by Mr. Lester (the manager of the Manchester Chamber of Commerce Testing-house)—in which it is seen that the composition of "petrol" is becoming more and more heterogeneous, and that there is a marked difference between the curves relating to petrol and that relating to alcohol.





But brief reference was made—owing to lack of time—to the employment of mixtures of alcohol and benzol, but the author stated that it had been shown that the thermal efficiency of a mixture containing 15 per cent. of benzol was quite as good as that of alcohol alone. Apparently, it is necessary to ensure the presence of a greater quantity of air, and to keep the temperature of the cylinder constant, but then, *at any given compression*, equal efficiencies are obtainable, though the allowable compression is less the greater the addition of benzol.

To show that alcohol is not only a suitable motor fuel, but that in many respects it is the most suitable, the lecturer gave further proofs by quoting some of the performances which have been made by cars recently in France. He did not think that high engine speeds would materially alter the conclusions he had drawn, especially if motor constructors would bear in mind the advisability of trying a somewhat greater ratio of stroke to bore than obtains in petrol motor construction in general.

Concerning the question of cost, Dr. Ormandy started by pointing out that it is not the best value of the fuel that affects the average user of a motor, but the cost in fuel to obtain a certain amount of work. Taking the relative heat of combustion of petrol and alcohol as 2 : 1 and their respective efficiencies at 20 per cent. and 30 per cent., it requires three parts by weight of the former or four parts of the latter to yield the same amount of heat. Taking, then, petrol at 1s. 3*d.*, alcohol must be obtained at 1*s.* 1·2*d.* per gallon to place them on an equal footing. In a similar way he showed that paraffin oil and alcohol should be sold at the same price to give equal economic results—assuming their respective efficiencies as being 15 per cent. and 30 per cent. As to the actual cost of alcohol, he said that from now up to the end of 1908, motor alcohol containing 10 vol. per cent. of water is to be had in Germany, delivered at the nearest railway station, at 9*d.* per gallon in lots of not less than 1,500 gallons, and at 10*d.* per gallon in lots of 40 gallons, cask free, but returnable. In quantities such as a pint, at retail dealers, it costs at the rate of 1*s.* 3*d.* per gallon, at which price it is still cheaper than petrol at 1*s.* 6*d.* In England methylated spirit in quantity can be obtained at 1*s.* 11*d.* per gallon, but when obtained it is not so suitable as a fuel either for motors or lamps as is the cheaper German spirit.

Regarding the position of the British motor user, he pointed out that he has little choice, it is petrol or paraffin, and for internal combustion motors the latter may be put on one side for the present, the difficulty of constructing an economical engine to work cleanly and well with this fuel being such that few constructors have succeeded in putting an acceptable one on the market. The lecturer then dwelt on the practical drawbacks that attend the use of inferior petrol, and laid great emphasis on the fact that it is an imported substance, and therefore one for which we are greatly in the hands of large foreign corporations, both in the matter of quality and of price. He pointed out that the demand for it is increasing at an enormous pace, and that the prospects of the automobile industry—especially in the future, when the general use of commercial vehicles will probably be the backbone of the industry—depend to a very great extent upon the cost of fuel. He called attention to the fact that only about 2 per cent. of the world's output of crude petroleum is even suitable for motor spirit, and—referring once more to Mr. Lester's curves—added the remark that "we shall be getting paraffin oil in petrol tins soon."

Amongst other interesting data concerning the relative advantages of alcohol as a fuel, he mentioned that the oxygen necessarily consumed in the production of an equal amount of power is, in the case of petrol, 11 volumes, whereas in the case of alcohol it is but seven. In the case of paraffin *v.* alcohol lamps for equal illuminating power, the air consumption is as 3 : 1, and the heat generated is in about the same ratio.

Continuing, he said that it has been proposed to use benzol—a product of the distillation of coal—as a fuel for motors, but it is worse than petrol in most of the bad points which distinguish that substance; and, moreover, it would not require a very large demand to send the price up out of reach.

Having shown that alcohol as a motor fuel is free for the most part from the objections urged against petrol; that it is, of all extensively-used liquid fuels, the most nearly ideal; that it is sold by the million gallons on the Continent for technical purposes, as a source of light, heat, and power. Dr. Ormandy then asked, why cannot we obtain it in this country at a similar price? to which he replied, that our present laws and our system of taxation render it impossible.

To give some idea as to the disadvantages British distillers labour under, he quoted a passage from a report on distilling apparatus, published in the "Annual" of the German Alcohol Manufacturers' Society for 1903:—

"Setting out from the point of view that time is money even in the distillery, we must characterise the use of periodic distilling machinery as a *great luxury*. With its use the distillation of the mash takes so long that it will not work in with the other operations if modern machinery is used, quite independent of the fact that the spirit thus produced has scarcely ever enough strength to fit it for direct use as a fuel for generating light and heat."

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*Excerpt from a Paper read at the Automobile Club, March 24th.

The periodic distilling machinery here referred to is the only sort *which can be used in a British distillery*.

In consequence of the disadvantages legally imposed on the British distiller, there is a tax on imported alcohol equal to about 9*d*. per gallon of 90 per cent strength—a so-called "differential duty," which means that we pay 70 per cent. to 100 per cent. more for our spirit than we should do if this tax were not imposed. He made it clear that our complaint as to the influence of this tax relates only to spirit to be denatured and used for industrial purposes. Continuing, he said:—It is evident that this subject of taxation is a most difficult one, and any proposal which tended to effect a diminution in the national income would receive short attention. Other nations have achieved what we wish to achieve without diminishing the gross receipts from the drink traffic in the least.

The commanding position in the motor car trade so long held by France should and would have been ours—for in this country the motor car had its birth—had it not been for those short-sighted laws in the removal of which this Club rendered such yeoman service.

Now it would seem as though our development was once more to suffer, owing to the want of legislation which practically every European and other more distant countries have seen the necessity of long since. You here know only too well what this country has lost owing to the delay in passing laws relating to traffic regulations which were suitable to the age; but you may not be so well aware what losses the nation has sustained owing to the position taken by the Government in relation to technical alcohol.

The lecturer then gave some extremely telling data concerning the aniline dye trade, by which he showed that, although the first aniline dye was discovered by Dr. Perkin in England, yet practically the bulk of the trade has now been secured by Germany, owing to the action taken by a far-seeing Government in that country. The following are a few of the facts brought forward:—

In the year 1892 Germany exported 21¾ million lbs. of such dyes, of which England bought 4¼ million lbs. In 1901 the same country exported 51 million lbs., and of this amount England took 11¾ million lbs. The average price in 1892 was about 2*s*. 4½*d*. per lb., and in 1901, 1*s*. 6½*d*. per lb. The paid up capital of 120 companies in Germany making dyes is about £16,750,000, and these have paid dividends averaging 12 per cent. for years. This state of affairs was not alone, nor even for the most part, owing to our unfitness from an educational point of view, to carry out the necessarily complicated processes required in the manufacture of such dyes, but owing to the fact that up to 1902 pure alcohol, such as is required in quantity in the necessary processes, cost in Germany about 1*s*. 3*d*. per gallon, and here over 22*s*.

It is true that our Legislature provided for the taxation, on importation, of such substances as contained alcohol, or which were necessarily made therefrom. To have enforced these imposts would, however, have ruined our enormous dyeing industry, as can be well imagined when we learn, for instance, that ethyl chloride costs to import 11*d*. per lb. The duty which might have been claimed was equal to about 2*s*. per lb. To save our dyeing industry it was chosen to forego the duty rather than to encourage our own countrymen to make the dye. So we continued to send our coal tar to Germany at a nominal price, and bought it back for millions of pounds sterling in the form of dyes.

The German Government recognised that, by allowing the chemical industry to have duty-free alcohol, the prosperity of the country would be so increased by the trade thus fostered, that the comparatively small sum foregone in direct duty would indirectly be many times recouped, and well have their expectations been fulfilled.

Concerning the question of alcohol for other purposes in Germany, he said the Government had taken little action as regards legislature concerning alcohol for other technical purposes—heat, light, or power—up to the year 1887. At that time commercial alcohol generally cost, retail, at the rate of 3*s*. 6*d*. to 4*s*. per gallon. Since then note the change! There is scarcely a village in the whole land where alcohol of guaranteed strength 90–95 per cent. cannot be obtained retail at 1*s*. 3*d*. to 1*s*. 4½*d*. per gallon. At this price it can be bought in stoppered bottles just as we are accustomed to buy mineral waters.

If it has been found possible to work this change in one country, are we, with such an example before us, to cry "*non possumus*," and adopt the parliamentary plan of trusting to muddling through when the pinch comes.

In the year 1900–1, Germany produced 406 million litres (about 4½ litres = 1 gallon). Of this, 112 million litres were used for technical purposes. In the same year, England's consumption of technical alcohol was 13 million litres. Please note that this total quantity of 13 million litres is a little over half the amount used by the German chemical industries, and about two-thirds of the quantity used in the manufacture of vinegar per annum.

The German consumption of spirit for technical purposes has grown from 71 to 112 million litres in six years; our consumption in the same period grew from 9 to 13 millions, ·7 million litres progress per annum. If we progress at the same rate, and Germany stands still, we shall be equally large consumers in the year 2064.

First, the German Government, seeing that cheap alcohol was a question of life and death to many industries, granted concessions as regards the use of duty-free alcohol to these trades, and now, as a consequence, the world's output of dyes, drugs, and artificial perfumes may be said to come from the German laboratories. Then, to encourage agriculture and to retain within the Kingdom some portion of the enormous sums being expended for oil for lighting and power, the Government put forward a system of taxation and excise which encouraged the cultivation of potatoes and the establishment of distilleries in the midst of potato-growing districts.

The result of this has been that now the area under potatoes in Germany is four times as large in proportion to its surface as is the case in Great Britain. The average annual crop 1887–1891 was 27 million tons; from 1897 to 1901 it was 40 million tons.

To gauge to the full the significance of this we must know that the nourishment contained in this 13 million tons increased production is 50 per cent. more than the nourishment contained in the total grain imports of an average year. About three-fourths of all the alcohol produced was made from potatoes.

But all the change in the law would by itself have been of little use. It was necessary to educate the masses of the people to know and to make use of the advantages offered them, to get manufacturers to make suitable lamps to burn the new fuel, suitable motors, ovens, and a hundred other things.

Here again the Government stepped in, offering prizes for the best of its kind in each class. They were aided by grants from the agricultural societies, both national and provincial, the distillers lent their aid, and last, but not least, the Emperor himself—not once nor twice, but repeatedly—showed his keen appreciation of the value of the movement by offering valuable trophies for competition.

Now they have incandescent lamps of from 20 to over 1,000 candle-power, cheaper by half to keep up than paraffin lamps, even with spirit at 1*s*. 1½*d*. per gallon. Professor Dr. Wittelshöfer, of the Central Society for the Distribution of Alcohol, in his annual address to the members of the Society of Alcohol Manufacturers in 1903, told them that in the first four months of 1902 they sold 270,000 litres of motor alcohol; in the corresponding period of 1903 they disposed of 800,000 litres.

In the first three months of 1902 and 1903 the numbers of lamps sold by this one society grew from 7,200 to 17,000.

Not until the Germans have driven paraffin oil out of their market will they be satisfied. As it is, post, army, and railway use alcohol for power and light wherever possible. Doubtless the thought that every litre of alcohol so used makes the nation more self-contained has its weight with the Government.

Concluding Dr. Ormandy strongly maintained that the case for a reduction in the price of alcohol for technical purposes is well established, and he showed the enormous advantages which would accrue to this country if our Government would only take the matter up in a thorough and practical manner. It would help the automobile industry, would encourage agriculture, would take back some of the 900,000 workers who have left the land since 1851, and would give us a food reserve in time of war. He, however, was far from being optimistic concerning the part which our Government was likely to take in this direction in the near future, and advocated the obtaining of the co-operation of everyone possible, and especially of those who lead the public Press, as being the surest, quickest, and only way of bringing about this much-needed reform.

IMPORTANT new premises at Clerkenwell Road have been secured by the Continental Caoutchouc and Gutta-percha Company. The new offices and warehouses are much larger than those at present occupied by the Company at Holborn Viaduct, and in connection with this further extension of the Company's business, new plant for the repair of motor tyres is being put down. Hitherto all tyres have had to be sent to the works, which, owing to transit, has caused a certain amount of delay. This for the future will be remedied, and tyre repairs will then be made in a few days. The importance of this departure is very great, as the difficulty of repairing motor tyres is such that they should only be entrusted to the best rubber manufacturers—a point which was very strongly emphasised recently by Mr. Siddeley in the admirable paper which he read before the Automobile Club in connection with pneumatic tyres.

RACES, RECORDS, AND TRIALS.

Glasgow-London Reliability Trial.—The last day for receiving entries without increase of fee for this trial, organised by the western section of the Scottish Automobile Club for May 19th-20th, is April 13th. Entries received to date are, we understand, satisfactory, and the pronounced success and the attention which the corresponding trial of last year attracted throughout Scotland, both of the public and in the press, should ensure a big entry list being received. Entries can be lodged with the Hon. Secretary, Mr. R. J. Smith, 59, St. Vincent Street, Glasgow.

Side-Slip Competition.—Fourteen days, commencing on April 18th, will be allowed for the Endurance Test of 1,000 Miles, with which this competition will commence, before the devices are submitted to the side-slip test at the Clement Talbot works at Ladbroke Grove. The daily routes will be arranged from day to day by the Technical Secretary. If possible these routes will be so arranged as to entail the cars stopping for two nights at some places in the Midlands, preferably at the headquarters of an affiliated club. In regard to the material to be used for making the track slippery, "slurry" is to be tried.

THE anti-skid devices which are now undergoing the long distance test from Paris to Nice and back have so far come through the ordeal with every sign of success. The competing devices comprise 3 Samson, 1 Herald, 1 Berliet, and 1 Fouilloy.

THE Bradford Chamber of Commerce have decided to appoint a representative to take part in the motor van trials being organised by the A.C.G.B.I., for October and November next.

THE first of the 1904 Gordon-Bennett Mercedes cars is expected to be out of the Cannstatt works about April 15th. In all probability it will be taken at once to Nice, where its paces will be tested.

No date has so far been fixed for the Belgium Circuit des Ardennes, but April 25th is the last date for receiving entries from those wishing to participate in the first ballot for order of starting. The Belgium National Circuit is to take place on May 27th. In this there will be two categories, viz., one for manufacturers or their agents, and the other for amateurs.

THE 1904 Competition of Carburettors, under the auspices of the A.C. of France, takes place on May 16th and following days. The tests, as usual, will be made in the club laboratory, and the devices must be delivered there not later than the evening of May 14th. The entrance fee is 150 francs for each carburettor submitted. Each one will be tested on a single cylinder Gillet-Forest motor driving an 8-k.w. dynamo. Results will be determined by (i) power developed at different speeds; (ii) consumption per k.w. hour at different speeds. The carburettors will be divided into three categories:—

(A) Carburettors designed for motors of a special type.
(B) " " " fuel " " "
(C) " " " any motor and any fuel.

LAST year Vichy had an automobile week. This year it is to be abandoned and an automobile meeting held at Lyons instead, under the auspices of the A.C. du Rhone, probably during the last week in May.

THE A.C. of America has arranged a 470 miles tourist run spread over eight days, commencing on May 26th. The start will be from New York, and the main points of stoppage will be Philadelphia, York (Pa.), Gettysburg, then back to Philadelphia and on to Atlantic City, Lakewood to New York.

Two extra classes have been added by the A.C. of America to their contest of commercial vehicles, announced to take place this week, viz., for heavy hauling-trucks, carrying respectively 6,000 to 8,000 lbs. load and 8,000 lbs. and upward. This makes eight classes in all for this contest.

BARNEY OLDFIELD appears to stand a very good chance of being suspended by the Racing Board of the American Automobile Association. He has been riding at meets not sanctioned by the A.A.A., and has also been party to certain match races recently in the south which do not appear to have the approval of the Association. Oldfield, however, is defying the authorities, but possibly if he contemplates a visit to Europe it would be best for him to accept the position, or he may find it particularly awkward to be debarred from taking part in any recognised racing upon this side of the "herring pond."

THE Aero Club of Belgium has received official notification from the 1905 Liege Exhibition Executive Committee that they are placing a sum of 100,000 francs at their disposal as prize money for a competition for dirigible balloons. The competing airships will be required to travel from Liege to Spa and back, a distance of 72 kiloms.

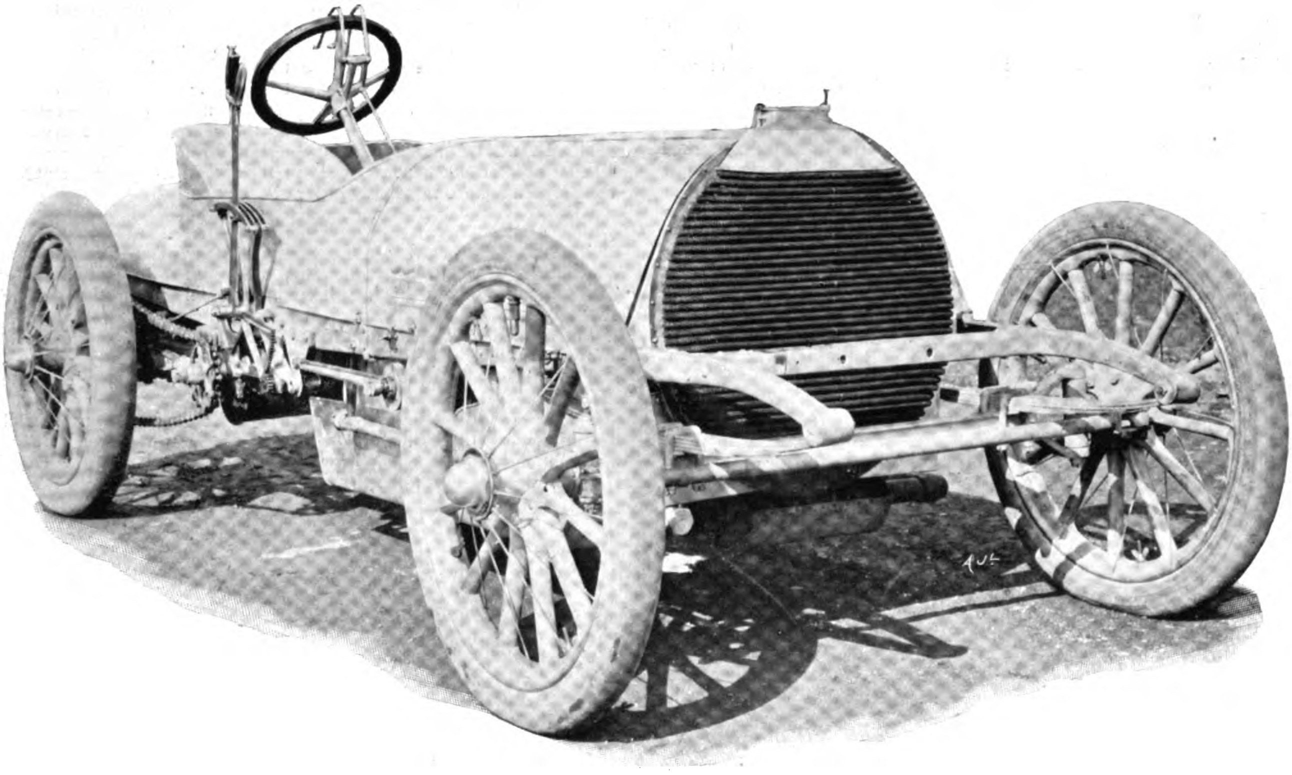
THE science of flying is to receive every encouragement in France. M. Archdeacon has added 25,000 francs to the prize of a similar amount offered by M. Deutsch for the inventor who is able to fly a distance from a certain point and return to the starting point, covering a total distance of 1 kilom. In addition the subscription list opened by *L'Auto* is gradually creeping up, and now totals to about 7,000 francs.

EVERY form of science appears as if it were to have a proper chance of representation in 1905 in connection with the 75th Anniversary of Belgian Independence. In addition to the utilisation of automobiles on an extensive scale, which we mentioned the week before last, the authorities who are organising the fêtes at Brussels hope to arrange a balloon competition, including arrangements for a navigable airship to travel from Liege and to arrive at Brussels during the height of the fêtes.

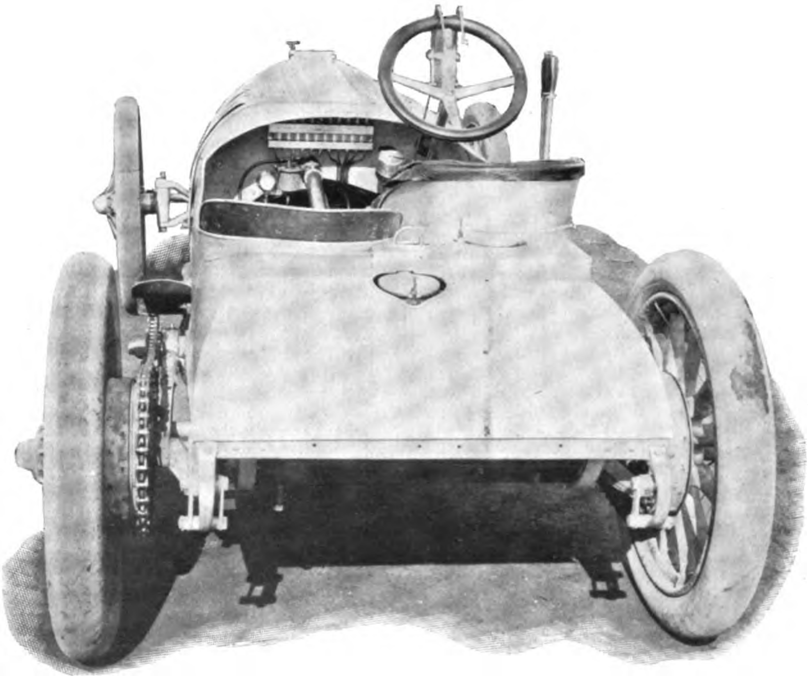
J. F. CRUNDALL was the winner of the 5 miles motor cycle handicap in 7 mins. 32⅕ secs. (15 sec. start) at the Good Friday Canning Town Sports, and on Easter Monday on the same track he also secured first place for the same distance in 6 mins. 56⅕ secs.

ENTRIES at single fee for the Paris-Bordeaux Motor Bicycle Endurance Test closed on March 31st. At double entrance fees (50 fr.) entries can still be made up to the 15th inst.

THE 72-H.P. WOLSELEY RACER.



A comparison of the two illustrations, which we are now able to give, with the side view that appeared in our columns last week, enables the general appearance and construction of this Wolseley racing car to be seen. The lower illustration is taken from the rear, and shows some of the fittings on the dash that are under the immediate control of the mechanician, as also the position of the large petrol tank at the back. In the other view the reinforced artillery wheels and the special radiator are clearly shown from the front. This particular vehicle, which is one of those entered for the Gordon-Bennett Eliminating Trials, is practically unaltered in design from last year, except so far as the radiator and the wheels are concerned, but the Wolseley Company are also building a 96-h.p. car for this important race, and it is now nearing completion. The larger vehicle will, we understand, have several very interesting features, and it may very naturally be supposed that the makers are chiefly pinning their faith to it to secure for them that most coveted of all automobile trophies—the Gordon-Bennett Cup.



A brief description of the 72-h.p. car was given in our last issue, and to this we have but little to add. It should, however, be pointed out that special radiator tubes are used for the large circular cooler — behind which is mounted a gear-driven fan— and that the stiffening wire spokes in each wheel pass radially from a flange at the outer end of the hub, and are led through the wheel between the wooden spokes to the inside of the steel rim.

Auto Cycle Club.—The Report for 1903 was presented to the Annual General Meeting of the members of this club, held at the Automobile Club, on Tuesday last, March 29th. The Report, which is of a satisfactory nature, after dealing with the main work of the club during the past year, pointed out that from the date when the club undertook the registration of racing men, no fewer than 280 registration certificates were granted throughout the country. Without this certificate, a motor cyclist is unable to compete in any open competition in England. This certificate is recognised by the governing bodies in Ireland and Scotland, and by agreement with the National Cyclists' Union, any rider suspended by the Auto Cycle Club is ineligible to take part in any open races on ordinary cycles. During the past season 46 permits to hold motor cycle races were issued by the club. As a result of the success attending the limiting of the cylinder capacity of the engines in last year's racing events, held at the Crystal Palace, on August 22nd, the committee have decided that this year open races shall be limited to machines of 76 bore and 76 stroke, or their equivalent volume swept out, except in the case of inferior grass tracks, where only 70 by 70 will be permitted.

The club, when asked by Lieut.-Col. Mark Mayhew, of the Motor Volunteer Corps, to assist him in obtaining the services of a large number of motor cyclists for the Army manœuvres in September last, was able without any difficulty to provide more than the number required.

The club has for some time been drawing up a scheme for the affiliation of motor cycling clubs throughout the country to the Auto Cycle Club, by which they will be able to have a voice in the control of the sport, and assist in the movement generally. The proposals will shortly be placed before the various clubs for consideration.

HERTFORDSHIRE AUTOMOBILE CLUB INAUGURAL RUN.—A few of the Members outside the Red Lion Hotel, Hatfield.

The membership of the club up to October 1st last was 93, and since then the membership has increased to 146.

During the coming season the following events will be held by the club:—This month (April), the Side-Slip Competition; May, the Anniversary Run and a Hill-Climbing Competition; July, the 1,000 Miles' Trial and the Annual Race Meeting. Several other events of interest are also in course of arrangement.

A Remarkable Motor Case.—Mr. Bernard Boverton Redwood was summoned to appear at the South-West London Police Court on Monday, the 28th ult., for driving his motor car at a speed alleged to be above 20 miles an hour—in fact the speed was sworn to by the constables at 30 miles an hour. They alleged that Mr. Redwood drove over a measured furlong on Putney Common in 15 seconds, as timed by them with a stop watch. Three policemen gave evidence. One stated that he stood at the commencement of the 220 yards, while another one stood at the other end of the 220 yards with a stop watch; that the first constable signalled to the constable as the car passed him, and when the car arrived at the end of the 220 yards the second constable stopped the watch, and the third constable swore that he was some distance further down the road. The evidence for the defence was that there was no constable at the commencement of the "trap," but that all three constables stood together at the roadside, and shouted to Mr. Redwood to stop; that immediately after the car had passed the three constables one of them walked up the road for a distance of about 20 yards, but none of the three constables were further apart from one another than 20 or 30 yards.

After a very patient hearing, Mr. Garrett said he had no hesitation in finding for the defence, and refused to accept the sworn testimony of the constables. Mr. Staplee Firth, who appeared for the defence, in addressing the magistrate said, as it had been clearly proved that the three constables had committed such gross and deliberate perjury, he would like to know whether his Worship would direct the Public Prosecutor to proceed against them or not. Mr. Garrett then said that the Inspector would no doubt report the case at Scotland Yard, and no doubt the police authorities would deal with it. Upon this, Mr. Firth asked for costs, whereupon Mr. Garrett pointed out that he would prefer not, in the present state of the proceedings, to make any order about costs.

A case was heard at the Marylebone Police Court before Mr. Curtis Bennett on Thursday, the 31st March, the Motor Transport Company having been summoned under the Act of 1878, for not consuming, as far as possible, their own smoke.

The alleged offence took place on the 24th February last.

The prosecution was conducted by the London County Council, and the case was defended by Mr. Staplee Firth, on behalf of the Motor Van and Wagon Users' Association.

The case occupied Mr. Curtis Bennett for a considerable time, and he ultimately found that the vehicle in question was a light locomotive under the Act of 1896 and was exempt, and that the Act of 1878 did not apply, and he therefore dismissed the summons.

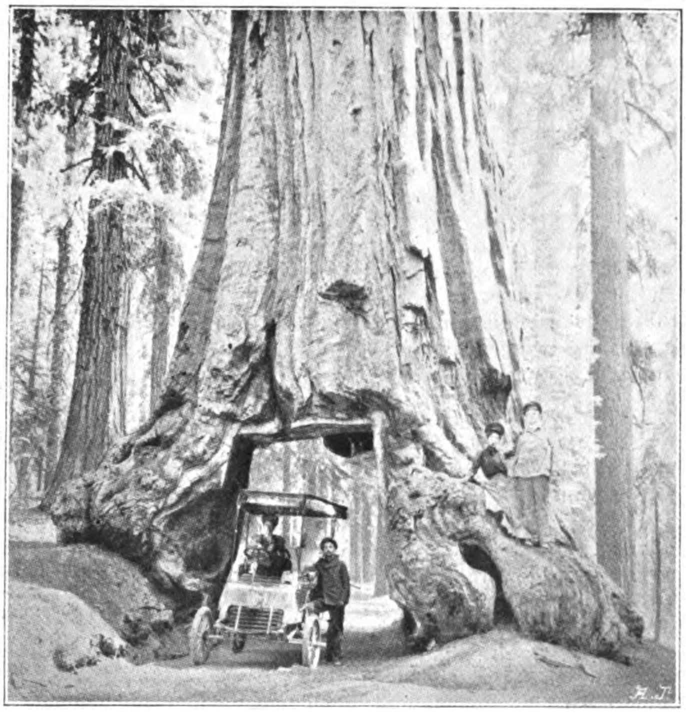
Last week, in the adjourned case of Captain D. H. Morgan, who was summoned for driving a motor car in Kensington Road on February 14th at a speed exceeding 20 miles an hour, the case was dismissed, as Mr. Lane, the presiding magistrate at the West London Court, said it lay on the prosecution to prove their case beyond all reasonable doubt, and he was not satisfied that that had been done in this instance. This was the case in which, upon the first occasion, Mr. Staplee Firth originated a test for the police stop-watches in open court. Evidence last week was given to show that the stop-watches of the police were liable to considerable error, either by accident or design.

In the case on Tuesday of Robert Forsyth, a young motor-van driver, who was charged upon an adjourned summons for driving a motor van in Chelsea to the common danger in December last, it was stated that he lost control of the machine in avoiding an omnibus and skidded on to the pavement, knocking down and injuring the wife of a cab driver. For the defence it was affirmed that the car skidded after the defendant had negotiated the corner carefully. Mr. Horace Smith, the presiding magistrate, decided that it was essentially a case for a jury, and sent the defendant for trial. During the hearing Mr. Horace Smith said he should like to know the principle of skidding. Mr. Lynch, who appeared for the defendant, replied that if he could devise a non-skidding tyre for bicycles and motors he would leave the Bar to-morrow, Mr. Horace Smith remarking that if that meant anything it meant that bicycles and motors should not be permitted, with which remark, according to the report, Mr. Lynch agreed. But why?

Mr. E. M. Bowden, the inventor of the Bowden patent wire mechanism and the Bowden brake, we regret to learn, died suddenly at Ramsgate, on Sunday last, the 3rd instant.

Lieutenant-General Lord Grenfell has signified his high appreciation of the services of the Motor Volunteer Corps during the inspection of London defences by himself and the Staff of the Fourth Army Corps, on March 24th and 25th.

The sole concession for the United Kingdom, for the Prunel cars, has been secured by the Normal Powder and Ammunition Company, Limited. This Company has recently amalgamated with Messrs. Holmes and Co., of Derby, and the car will in future be known as the Holmes-Prunel.



We all know the picture of the giant tree of California with a cart and horse passing through a tunnel cut in its base. A more progressive picture is afforded by the above illustration, which shows an automobile, belonging to Major Fulmer, of Los Angeles, replacing the time-honoured horse and cart, and serving almost more conspicuously to emphasise the enormous bulk of the forest giant. Our picture is taken from "The Motor" (U.S.A.).

Lord Farquhar is one of the latest noblemen to order a 6-cylinder Napier car. Vehicles of the same model are also being delivered to the order of Mr. John Aird, Mr. Lionel Rothschild, and Mr. Roger H. Fuller, whilst Mr. A. J. Balfour is availing himself of his 6-cylinder Napier for the entire Easter recess.

An import duty upon petroleum and its various products is a possibility in the forthcoming Budget. Any imposition of this sort must necessarily fall upon the consumer. The prospect of motor spirit being further reduced appears, therefore, to be further off than ever. A return in the near future to the price charged up to a recent date is, unfortunately, more likely.

Owing to the arbitrary and unnecessary restrictions of the local authorities, the valuable motor car service in connection with the railway between Ilfracombe and the surrounding district has had to be stopped. Sir George Newnes, M.P., was fully justified in his complaint against the Local Council when he made this announcement at the meeting of the Lynton and Barnstaple Railway Company held last week.

In connection with the Cyclists' Volunteer Easter operations, Col. Courtenay, chief staff officer of the North-Western District, was able to keep in touch with the whole of the movements by the use of a motor car. The forces reconnoitred that part of Cheshire lying between Chester and the sea on the west to the road from Northwich to Warrington on the east, a front of about thirty miles.

In the Wolverhampton Corporation Parliamentary Bill, asking for power to construct tramways and other undertakings for municipal purposes, it is sought to join up the tramways with other districts by running motor omnibuses to act as feeders. It is also proposed to use these motor omnibuses during the period of construction of the tramways. At the present time several districts are served in the borough by horse-drawn omnibuses, and the Corporation have provided against competition with these during the next two years.

The Locomobile Company of Great Britain have secured the sole agency for the Spyker cars in this country, and these vehicles will, in future, be obtainable from this Company's premises in South Kensington. We are told by Mr. Arthur E. Perman, who has control of the sale department of the Locomobile Company, that certain modifications have been made in the designs of the cars since the exhibitions to suit the requirements of the Locomobile Company. The front spring hangers, for instance, are now being altered in shape in such a way that the springs now lie beneath their front ends, and there is no cross-pin. Both the side levers are now being mounted about the same centre instead of the brake-lever being fitted behind the change-speed-lever. The position of the lubricator, too, on the dash is being changed, the steering column and the side levers are of brass instead of being black, and a manometer is being fixed to the dash. The vehicles are being made in three sizes—14-h.p., 20-h.p., and 25-h.p.—and a standard pattern body of altered shape has been adopted for them, this being both roomy and comfortable.

Special emphasis is laid upon the fact that except for the tyres and electrical apparatus, every part of the cars is made in the Spyker factory, where every part is constructed strictly on the interchangeable system. It is claimed, too, that the latest Spyker vehicles are remarkably silent, and that there is no appreciable vibration of any kind. The first consignment of vehicles made for the British market are due in a few days, after which time we are told that early deliveries can be made throughout the season.

We have received some further particulars concerning the 200-h.p. Bellamy racer, which we illustrated recently, from the Automobile Components, Limited, of 366, Euston Road. They inform us that the engine is of the new Soncin-Automotor type, and that the bore and stroke are 150 mm. instead of 183 mm. as previously stated. They tell us, too, that their new 8-cylinder engine, although practically identical in design, has been considerably reduced in weight, and that they can now produce engines giving this power at about two-thirds of the weight. The Bellamy car, too, appears to have a Bozier two-speed gear fitted to it.

The International Alcohol Exhibition at Vienna will be opened on the 15th instant.

The Italian War Minister has decided to greatly extend the use of motor cars for military purposes in connection with all the important Italian garrisons.

M. Santos-Dumont has been created a Knight of the Order of the Legion of Honour. M. Dumont, who recently returned from America, is energetically getting ready for the first trials of his No. 7 airship, with which he hopes to secure the big prize offered by the St. Louis Exhibition authorities for an airship traversing a prescribed triangular course within a given time. The full conditions and an official plan of the prescribed course were given by us in the Journal on January 3rd, 1903, page 19.

Some remarkable figures are published of the French exportation and importation of automobiles for the past three years. The export figures for automobiles for the three years are as follows: 1901, 15,782,000 francs; 1902, 30,219,000 francs; 1903, 50,892,000 francs. The import totals for cars are: 1901, 576,000 francs; 1902, 1,068,000 francs; 1903, 1,508,000 francs. It will be seen that the exportations have considerably more than trebled themselves in the three years, and the figures in connection with motor cycles have progressed in equal ratio. It is therefore hardly to be wondered at that every official encouragement is being given by the French Government to help forward an industry which is bringing such enormous sums into the country from foreign nations.

The Licensed Automobile Manufacturers of America report very marked progress in their scheme for controlling the automobile industry in the United States. Since January 1st, 1903, 87 unlicensed automobile concerns are reported to have discontinued business through failure and other causes, whilst only one member of their own body has succumbed. A special examination of the 1904 models of unlicensed manufacturers at the shows has been made by one of their experts, with the result that 454 infringements have been scheduled. It is claimed that even if the Association are beaten badly over the Selden patent claims they can still control the whole of the industry by the large number of minor patents of which they hold the rights. The infringers of these minor patents are, it is stated, now to be vigorously proceeded against.

On Tuesday last the case of Mr. Ulric Truman, of Amersham, was before the Bucks Quarter Sessions, upon appeal from the decision of the Beaconsfield Magistrates, who fined the defendant £2 and costs for driving a motor car to the common danger. The appellant rounded a corner at the rate of 10 miles an hour and injured a dog belonging to Major-General Prior, of Gerrards Cross. Mr. Trueman maintained that he did not exceed six miles an hour and did not stop because he thought the dog was not injured. The Court quashed the conviction.

The British Automobile Commercial Syndicate, Limited, advise us that they have been appointed the sole agents for the Hotchkiss car, manufactured by the famous firm of the Hotchkiss Ordnance Company. Latest models of these cars will be on view at 97 and 98, Long Acre, London, W.C.

We are in receipt of two interesting booklets on motor cycles. One by the Ariel Cycle Company, Limited, which not only gives a comprehensive and detailed description of the working parts of their motor cycles, but also gives some very useful hints on how to drive them. The other booklet is a catalogue of Components', Limited, specialities, in which we notice specifications of their motor cycles and a lengthy price list of their component parts.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Automobile Company of Cardiff (Limited), 20, Charles Street, Cardiff.—Capital, £2,000 in £1 shares. First directors, G. L. Watson and A. S. Little.

H. H. P. Deasy and Co. (Limited), 10, Brompton Road, S.W.—Capital, £40,000 in £1 shares. Object, to acquire the business now carried on at 217, Piccadilly, W., as Deasy and Co., of automobile factors, agents, manufacturers, repairers, &c. First directors, Major E. de Beaumont, K. H. Buchanan, and Captain H. H. P. Deasy.

Legros and Knowles (Limited).—Capital, £20,000 in £1 shares. Object, to carry on the business of ironfounders, mechanical engineers, manufacturers of motor cars, motors, and self-propelled vehicles of every description, &c.

Putney Motor Company (Limited).—Capital, £5,000 in £1 shares. Object, to acquire the business now carried on by A. E. Stewart Craig, G. L. M. Dorwald, and E. A. D. Kisch, at 17, Grand Parade, Putney, S.W., as the Putney Motor Company. First directors, A. E. C. Craig, G. L. M. Dorwald, and E. A. D. Kisch.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published April 7th, 1904.

5,805. G. P. J. Lion. Carburetting by means of naphthaline.
6,723. H. T. and H. A. Dawson. Electric ignition.
9,468. C. H. Wilkinson. Pneumatic tyres.
10,091. A. A. De Loach. Variable speed mechanism.
10,817. J. Hopper. Motor road vehicles.
11,471. W. and H. Starley. Motor bicycle stands.
18,382. F. G. Seeley and L. Tolch. Variable speed mechanism.
21,037. F. H. Smith. Governing of explosion engines.
26,659. P. Masson. Magneto-electric ignition devices.

Applied for in 1904.

Published March 31st, 1904.

114. P. Duflos. Sparking plugs.
1,296. A. J. Postans. Electrical ignition apparatus.
2,302. C. L. Schmidt. Coolers.
2,839. A. A. Longuemare. Carburettors.
3,129. — Gardner. Automobile frames.
3,225. — Oubrard. Acetylene gas lamps.
3,259. — Alloatti. Anti-skid tyres.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

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MONACO MOTOR BOAT MEETING.—A General View of La Condamine and the surrounding Mountains.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
Apl. 16	Examination of Cars for Gordon-Bennett British Eliminating Trials.
Apl. 18–24	*Side-Slip Trials.
May 7	*Quarterly 100 miles Trial.
May 10	British Gordon-Bennett Race Eliminating Trials.
May 14	Nottinghamshire Club Hill Climb.
May 19–20	Glasgow-London Non-Stop Run.
June 1–7	Motor Bicycle Endurance Trial.
June 11	Automobile Races, Ranelagh Club.
July 30	British International Cup for Motor Boats.
August	Reliability Trials for Motor Boats.
Sept. ...	*Reliability Trials.
1905.	
May 1	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Apl. 16–May 31	Vienna Auto Show.
Apl. 17	Coupe Meyan (Motor Boats).
Apl. 18–23	Paris-Nice-Rome.
Apl. 30–May 12	Antwerp Salon.
May 8...	Exelberg Hill Climb (A.C. Austria).
May 16	Carburettor Trials (A. C. de France).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20	French Gordon-Bennett Race Eliminating Trials.
May ...	Guadarrama Hill Climb (A.C. Spain).
May 8–12	A.C. Bordelais Automobile Week.
May 11–15	Milan Exhibition and Tourist Trial.
May 12	Perigueux Hill Climb (A.C. Dordogne).
May 12–15	Tours Tourist Trial.
May 27	Circuit National Belge.
May 23–31	Aix-les-Bains Week.
June ...	Dourdan Kilom. Trials (*L'Auto*).
June 7	Namur Week.
June 17	Gordon-Bennett Race.
July 10	Mont-Cenis Hill Climb (A.C. Italy).
July ...	Speed Trials (*L'Auto*).
July 16–17	Ostende Motor Boat Races.
July 17	Antwerp–Ostende Motor Boat Run.
July 15–23	Ostende Week.
July 22	Kiel Motor Boat Races.
July 23-25	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11	Paris–Deauville Motor Boat Race.
Aug. 12	Motor Boat Race for Gaston Menier Cup.
Aug. 13-14	Calais-Dover-Calais (motor boats).
Aug. 15	Calais-Boulogne-Calais (motor boats).
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28	Ventoux Hill Climb (Avignon).
Sept. ...	Deauville Automobile Meeting (*L'Auto*).
Sept. 2	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22	Leipzig Cycle and Motor Show.
Nov. 20	100 Kiloms. Trial (A.C. Algeria).
Dec. ...	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Blackmailing Chauffeur.

There is a matter to which we have referred more than once in the past, but it is of such serious importance, both to automobile manufacturers and to car owners, that we have no hesitation in alluding to it again, more particularly as, judging from the numerous letters and communications we receive on the subject, it would appear that the evil in question is showing signs of recrudescence and development on a large scale. We refer to what are practically attempts on the part of car drivers in private employment to blackmail the manufacturers of the cars which it is their duty to drive and keep in order. The way the process is worked is usually somewhat as follows :—A driver goes to a new place and finds himself entrusted with a particular make of car, or he is engaged by an employer who has recently purchased a car. The driver then puts himself into communication with the manufacturer of the car, with the request or suggestion that a payment in cash might suitably be made to him. If the manufacturer refuses this obvious attempt to extort blackmail, something usually happens to the car. Its running becomes unsatisfactory, and its minor parts get out of order. Of course, this game cannot be played with much effect in the case of the cars of the great makers. Even the most ignorant car owner is little likely to believe that a high-priced vehicle turned out by one of the great firms of world-wide reputation, is liable to get constantly out of order unless the chauffeur is to blame. But the imposition is not so obvious in the case of vehicles built by comparatively small firms, and it is in consequence just such firms that will experience the greatest temptation to give way to the demands of the blackmailing driver. The evil must be stopped, and stopped at once. If any considerable number of manufacturers give way in such a matter, they will be unable ever to assert themselves again. The best plan they can adopt is to immediately inform the secretary of the Automobile Club when any driver makes such a demand. The manner in which the dishonourable drivers of this type will then become known to a body which exercises considerable influence among employers, and the knowledge that when a driver makes an attempt to extort money in this way he is liable to be practically blacklisted at the Automobile Club, is certain to exercise a powerfully deterrent effect. And it appears that it is only in some such way that the evil can be dealt with. Let every manufacturer, should he even for one moment be inclined to yield to the demands made, only recognise that it is the most short-sighted policy he can adopt, and the evil will rapidly disappear. The growing knowledge and acquaintanceship of owners with the mechanism of their vehicles, which increases every week and almost every day, is likely to act as a further check. In the hands of the unprincipled blackmailing driver there is a frequent tendency for parts to get out of order which, when left to themselves, practically never do so. When a car owner notices this sort of thing happen he is justified in becoming suspicious.

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Another 10-Mile Demand.

The first inquiry in connection with the proposed introduction of the 10-mile limit was held at Winchester, and we referred to it a fortnight ago. The case advanced by the Winchester Town Council was a singularly weak one. As we said at the time, they hardly seemed to believe in it themselves after hearing it publicly advanced, and we, in common with the whole automobile world, were consequently hoping that the Winchester inquiry in addition to being the first of its kind, would also have the honour of being the only one ever held. Dover, however, decided to share Winchester's reactionary laurels, and a similar inquiry was accordingly opened there on Thursday, the 7th inst. The general lines taken by the inquiry were very similar to what occurred at Winchester, though the witnesses called by the opposition—the Automobile Club, the Motor Union, and the Kent Automobile Club—were not the same. They brought forward practically the same arguments however, the principal of which was, of course, that no real security would be afforded to the public by the 10-mile limit, and that the only effect of it would be to exasperate motorists, keep them away from the town, and facilitate the effectiveness of police traps without in any way contributing to the safety of the public. That is, of course, the gist of the whole matter. The public is amply, superabundantly, protected by the general speed clauses of the Act. We do not believe that the people who have demanded a 10-mile limit really think that it would afford any extra protection. But they do probably think it would facilitate the apprehension and conviction of automobilists, and so increase the steady flow of fines in relief of the local rates. That the rateable value of the town, as a whole, is likely to suffer by holding out such a substantial inducement as the 10-mile limit to automobilists to avoid it altogether, does not occur to these reactionaries. We trust the L.G.B. will decide both these cases on their merits. Should they, by any error of judgment, agree to the imposition of the 10-mile limit, after the singularly weak arguments in its favour that have been put forward both at Winchester and Dover, other similarly-minded local bodies are sure to be encouraged to apply for the 10-mile limit, and its adoption at all generally would be nothing less than a calamity for the industry. The importance of discouraging these mistaken demands on the part of local authorities is well illustrated by the fact that 22 applications have, up to the present, been made for the 10-mile limit. Of these 6 have been withdrawn and 2 enquiries held, thus leaving 14 still pending—the withdrawal of which is greatly to be desired. Needless to say, the number of these that are withdrawn and the number persevered with will very largely depend on the decision of the L.G.B. in the Winchester and Dover cases.

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The Way to Report Things.

It is quite impossible for a horse-drawn vehicle ever to collide with a motor car. If a motor car is standing quite still and the horse-drawn vehicle runs full tilt into it, it is still the automobile which collides with the hippomobile—according to the fashion prevailing in the daily press. This, at any rate, is the manner in which the regrettable accident to Prince Frederick Leopold in Berlin is described in the daily papers. Prince Frederick Leopold was driving along quite quietly in his motor vehicle when a runaway cab dashed into him, the shaft seriously injuring his leg. We are informed, however, that "the motor car collided with the runaway cab." The same principle of misreporting any accident in which a motor car is concerned is amusingly illustrated by the following two accounts which we print side by side, one being that which first went the round of the daily papers, and the other the true facts of the case :—

The First Legend.

SERIOUS MOTOR-CAR SMASH.

A motor car which was being driven through Maidstone towards London last night ran into a pony attached to a governess car containing two young children of Mr. J. A. Wigan, a Maidstone banker.

One of the pony's feet was cut off, and it was necessary to slaughter the animal. The occupants of both vehicles were uninjured.

The True Facts.

In reference to the report of a recent mishap near Maidstone, Messrs. Hulbert, Crowe, and Hulbert, solicitors, acting for the gentleman who was driving the motor, write :—The car, which contained three ladies as well as our client, was not being driven at a rapid rate, but, on the contrary, was at a standstill at the moment of the accident. The nurse who was driving the governess car (which contained one child, and not two children, as alleged) had partly passed the motor, when the pony got out of control, turned suddenly round, and when in the act of bolting put one of his hind legs through spokes of the off-side front wheel of the motor, and fell. In struggling to get free the animal wrenched off its hoof, and had to be killed. The wheel of the motor, which had a rubber tyre, did not pass over the pony's leg, and, even if it had done so, it is highly improbable that it would have cut off the foot, as alleged. The governess car was not touched by the motor, and was not damaged, and our client was in no way to blame for the occurrence.

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The "Spectator" among the Prophets.

However advanced a proposal may be thought to be, when once it has been advocated by the *Spectator* it can no longer continue to be looked upon as alarmingly revolutionary. In fact, it may thenceforth be regarded as enjoying a considerable amount of what it is customary to term "solid" support. It is therefore with great satisfaction that we find the *Spectator* in a lengthy article in its current number advocating, on grounds of public policy and expediency, that where tramway concessions are made, they should only be permitted on condition that the tramway company pays for the widening of the road to an amount equal to that appropriated to the tram service. "The equity of the matter" is, as the *Spectator* says, "perfectly plain." It is, and it is one which we have always consistently and persistently advocated. The proposal was originally put forward by the Roads Improvement Association, and in a leaderette as long ago as June 7th, 1902, we advocated it strongly. Since then, the general justness of the demand has met more recognition than we had originally ventured to hope for. It has been made a condition by at least one public body, and now to this is added the support of a cautious and widely respected literary and political journal of the highest standing. It is really a very satisfactory sign of the times and a proof that the requirements of high-speed traffic, as represented by the bicycle and the automobile, and their paramount importance for our great towns, are becoming generally recognised. The imperfections of a tram service, its inflexibility and its rigidity, are also being admitted. As we said in June, 1902:—

> "The tramcar is as inflexible as fate. Nothing deflects it from its course, and it has not even the scanty capacity of accommodating itself to the requirements of other vehicles possessed by the 'bus or brewer's van."

It is the recognition of this feature of every tram service which has largely provided the inspiration of the *Spectator's* article.

There is, however, a corollary to the argument which, strangely enough, the *Spectator* fails to recognise. Though it is, no doubt, quite equitable that where a tram company desires a concession it should be compelled to widen the road, yet there are sure to be plenty of cases where, though rapid popular transit is highly desirable, house property is dear and projected tram companies will boggle at the expense of widening. Such are pre-eminently cases for the organisation of automobile 'bus services. Services of the kind are proving very satisfactory and popular in several of our seaside towns. We trust that local authorities in future who have to consider the question in all its bearings will keep this alternative in mind. Electric tramways are seldom things of beauty, nor are they inherently desirable in themselves. Quite apart from congestion of traffic, they make the road very unpleasant for other users. We believe the time has come when local and municipal authorities would consult the true interests of those they represent much more effectively by organising public automobile 'bus services than by introducing trams, even on the compensatory widening system.

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Car Registration and Change of Ownership.

AMONG the various idiosyncrasies of the 1903 Act must be mentioned the manner in which it deals with change of ownership of a car. According to the Act a registered number adheres to the car and not to the owner, and consequently when a car changes hands either the purchaser or the former owner can, on payment of a 5*s.* fee, demand the rectification of the register by the insertion of the change of proprietorship, and require at the same time a copy of the altered entries in the register. If, however, the original owner desires to retain the same number for another car, he has no alternative but to cancel the registration altogether, and register his new car under the same number. There is no obligation on the registering authority, even in this case, to give him the same number over again, though probably they would not refuse. It will be observed that the cancellation of the old registration will involve the re-registration of the car by its purchaser, and will add £2 to the costs of the sale. The provision of the Act is a very unreasonable one, as it is obvious that the registered number ought to be the property of the owner and not belong to the car, particularly as there are a good many car owners who have a special fancy for a particular number and have been at considerable pains to secure possession of it.

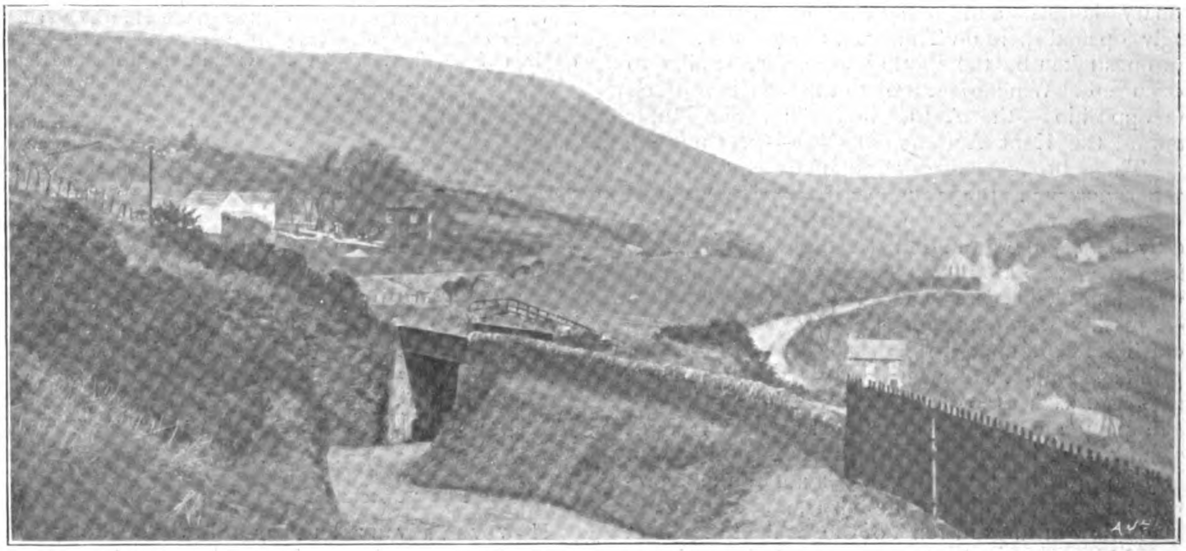
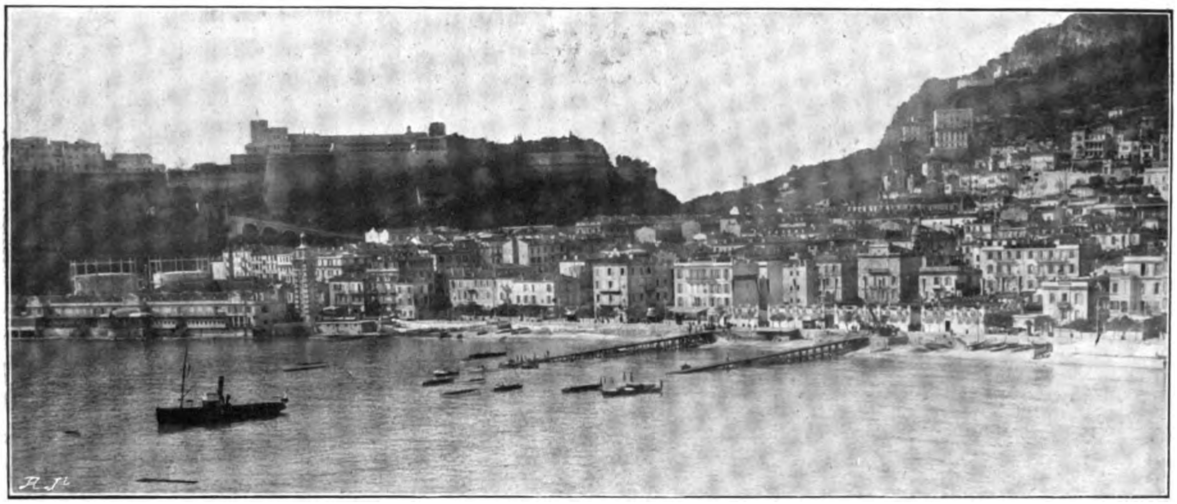


Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—In our photograph is shown the only really bad turning on the entire course. As will be seen it is practically a right angle turn under the railway bridge, and is situated, as we mentioned in our issue for April 2nd, just by Lower Foxdale.

MONACO MOTOR BOAT MEETING.

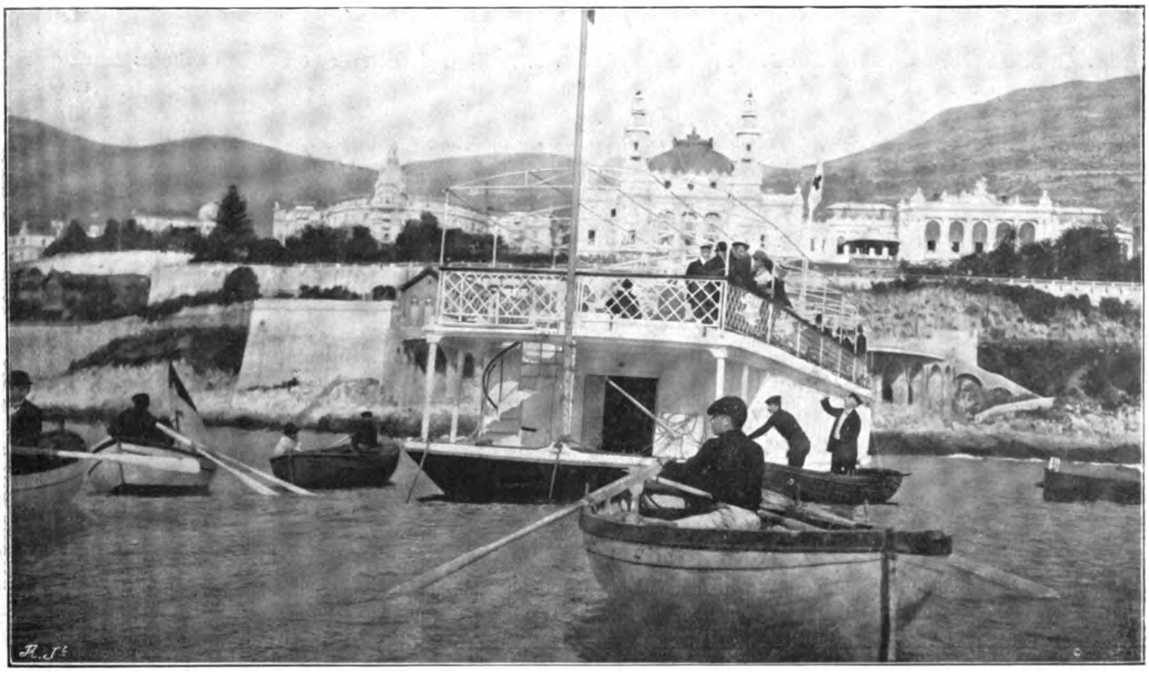


MONACO MOTOR BOAT MEETING.—A General View of the Front of Monaco. In the centre will be seen the Crane and Slips by which the boats are taken into the sea from the Exhibition, immediately behind which is the Exhibition Building where the boats are on view.

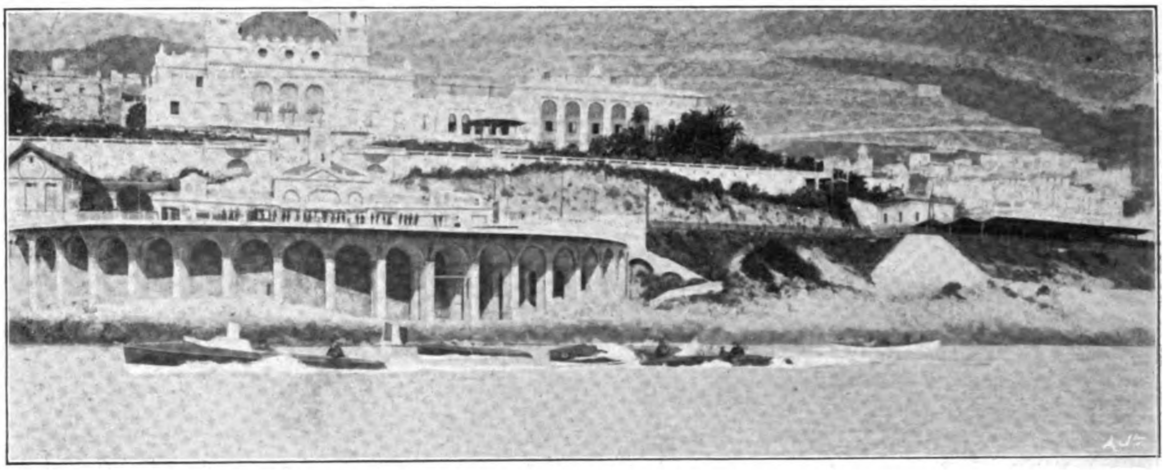
Last week we were able to give the result ot the first day's races, in which La Rapee III. was winner in the Racers' Section for boats up to 8 metres, and La Marguerite in the Cruisers' Class for boats up to 6½ metres. The daily events since then have kept the excitement and interest almost at fever heat, an enormous crowd of spectators gathering at the main points of advantage to witness the interesting races. From all parts the visitors assembled and thronged the terraces, Princess Henry of Pless, amongst other notabilities, coming over from Cannes. So successful has the meeting been that the Committee of Organisation, under the Presidency of M. Camille Blanc, decided at a meeting held at Nice on Thursday last week to extend the already generous programme. They arranged for an extra day's racing, with extra prizes for handicap races amounting to 16,000 francs divided equally between the racers and the cruisers.

On the second day, when the events were for racers from 8 to 12 metres and cruisers under 8 metres, a great disappointment awaited those who felt confident that Mr. Edge's Napier boat would be a certain winner in the former section. Unfortunately, soon after the start for the 200 kiloms., a circulating pump became choked, causing excessive overheating, which compelled Mr. Edge's boat to retire from the contest.

The cause of the mishap was comparatively trivial, although none the less annoying. We learn from Mr. S. F. Edge that, wishing to make his engine conspicuous by its silence, he had water-jacketed the exhaust-pipe, and that during the race it was the separate circulating pump supplying this system that became choked. The exhaust-pipe in consequence became white hot, and its proximity to the petrol tank rendered discretion the better part of valour, and decided Mr. Edge to abandon the race.

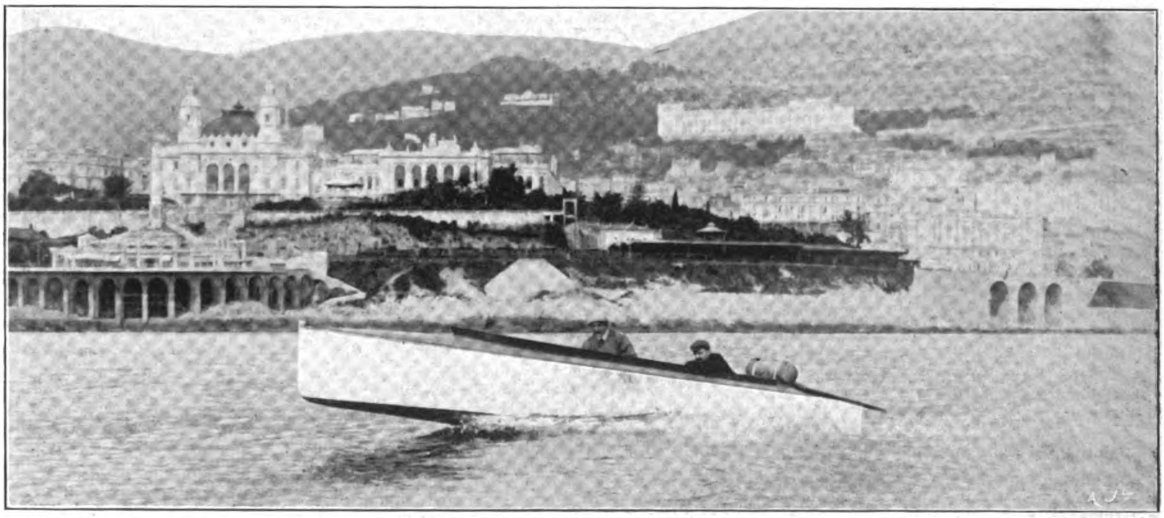


MONACO MOTOR BOAT MEETING.—The official House Boat from which each of the races are started and finish.

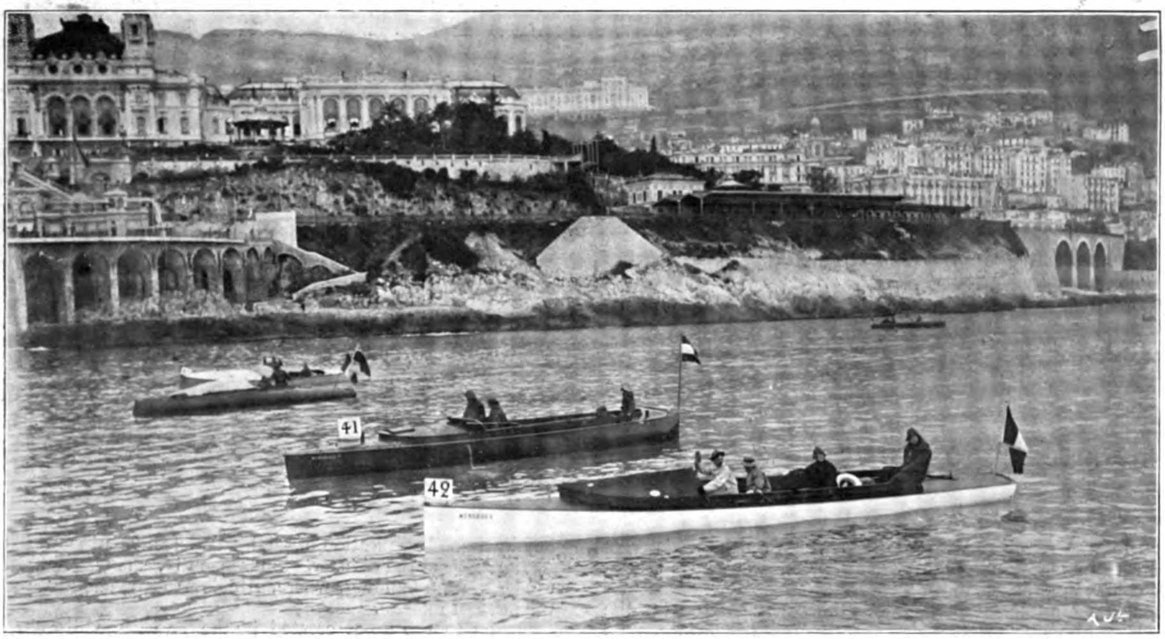


MONACO MOTOR BOAT MEETING.—The start of the Racers on the first day. La Rapée III., the Winner, is leading, and, as will be seen, got away in front immediately.

MONACO MOTOR BOAT MEETING.—La Rapée III. at full speed rounding one of the Buoys marking the Course.



MONACO MOTOR BOAT MEETING.—"Loodit," the motor boat which missed being the winner on the first day, in the Cruiser Class, by ⅖secs. only. Time for 60 kiloms., 3h. 22m. 23⅗s.



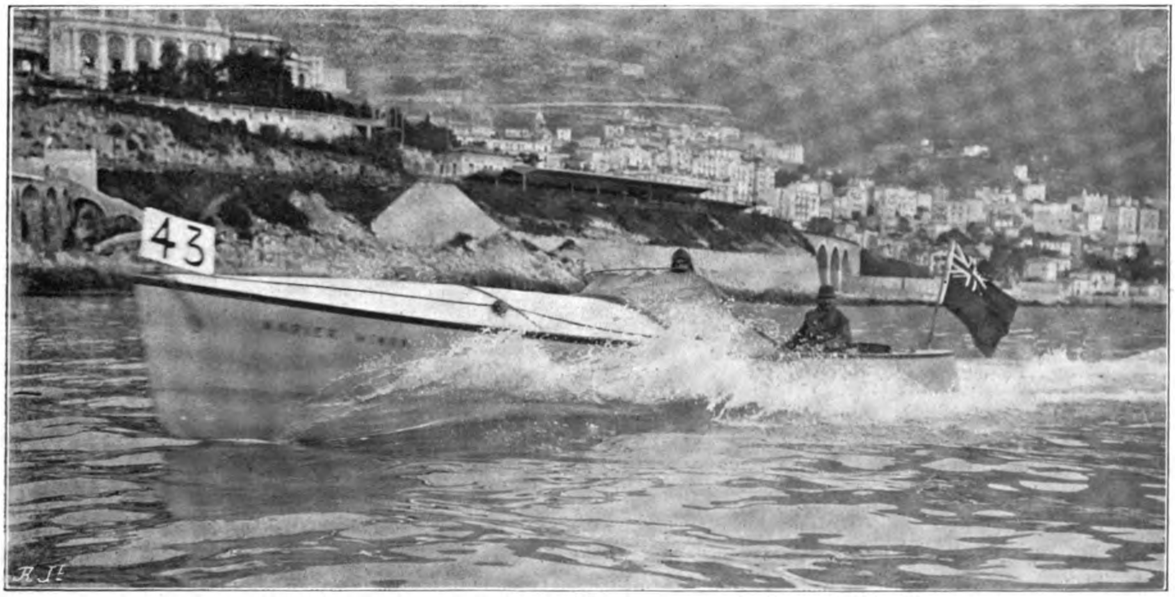
MONACO MOTOR BOAT MEETING.—The start of the Racers for the second day's series. The Winner. Trefle-a-Quatre, in this event, is the third boat in the picture, the two first being Mercedes I. and Mercedes III. respectively. The winner's time was 5h. 16m. 51⅗s. for the distance of 200 kiloms., giving an average of nearly 24 miles per hour. The time of Mercedes I. was 6h. 39m. 27⅕s.

Four of the entered racers started, two only, however, finishing the course. Napier, for the reason already stated, and Mercedes III., belonging to M. Jellineck, which nearly got swamped in the wash of Mr. Gordon-Bennett's yacht Lysistrata, being both placed *hors de combat*. The remaining competitors were Trèfle-a-Quartre and Mercedes I., which came in first and second respectively, the German boat being about 83 minutes behind the winner, whose time was 5 hrs. 16 mins. 51⅗ secs. The average speed of Trèfle-a-Quatre is nearly 24 m.p.h., each round of the course being covered with remarkable regularity, differing only by a second or two. The pace at which she got away immediately the signal was given was a revelation.

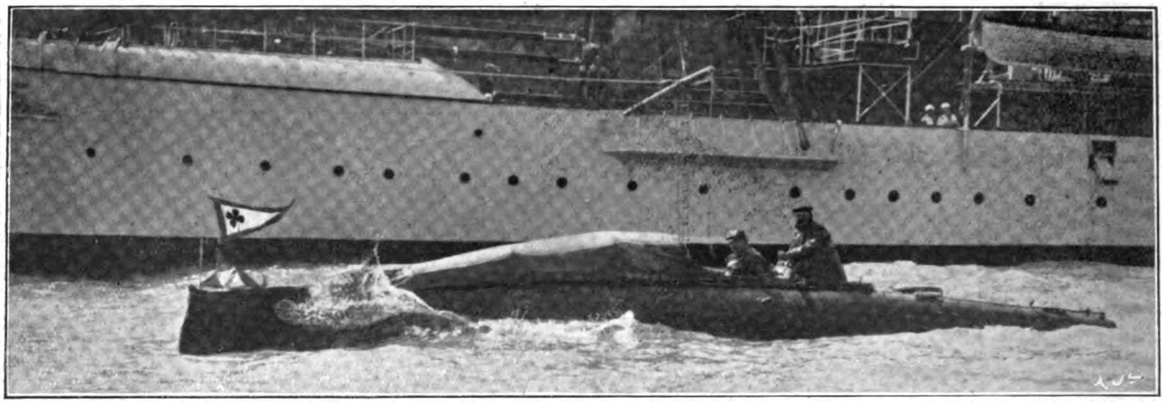
Ten cruisers were sent off by the starter for the course to Nice and Antibes and back, and thence to Mentone and back, a distance of 85 kiloms. All 10 completed the full course, the first prize going to Peugeot III., for the time of 3 hrs. 55 mins. 16 secs.

The third day's racing on the 7th contained no elements of excitement, and, from the scanty list of entries and contestants, formed a not unwelcome lull in the lengthy programme. The weather, which had so far been exceptionally fine, was inclined to back down, and give a little trouble. Only two boats were entered for the 12-18 metres cruiser class down for this day, viz., Femina and Rotceh. The former was disqualified, and the event resolved itself into a "sail-over" for the latter, which covered the 125 kiloms. in 6 hrs. 33 mins. 26 secs., the course selected being between Nice, Mentone, and San Remo.

For the other event, motor fishing boats, Dalifol only was entered. This craft, which used alcohol as fuel, and therefore



MONACO MOTOR BOAT MEETING.—Mr. S. F. Edge's "Napier Minor" travelling well. Owing to an unfortunate accident the English Racer had to abandon further participation in the Race.



MONACO MOTOR BOAT MEETING.—The Trefle-a-Quatre, entered by Georges Richard Brasier. The Winning Boat in the second series for Racers.

qualified for the special prize offered by the French Minister ot Agriculture, in addition to the ordinary prize, went over the 65 kiloms. course in 5 hrs. 58 mins. 14 secs.

Although a Gardner-Serpollet motor boat was entered for the steam class, also due for this day, M. Legres, her owner, paid forfeit, and no competitor was present when "Time" was called.

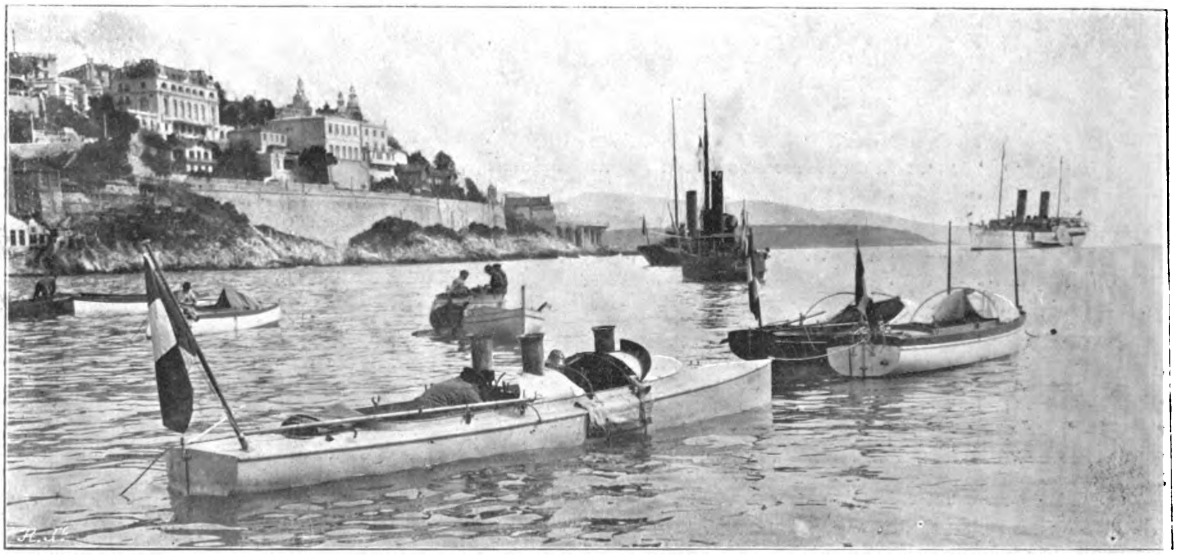
With the progress of the meeting, although the entry list gradually thinned, no diminution in the interest of the public was experienced, as the more powerful boats, with motors ranging up to 180-h.p., were now coming into the running. For the Friday, racers of 12 to 18 metres and cruisers from 8 to 12 metres ran off their events, and an unrehearsed incident, the sensation of the week, was reserved for this day. Pariesienne II, the 70-foot boat fitted with three Mors motors, soon after making a poor start, was seen suddenly to burst into flames, the unwonted occurrence being heralded by a cannon shot from the Antoine fort. Mr. Lorne-Campbell Currie, who was in charge of the boat, and his companions, MM. Suillaumare, Coissinet and Coulon, soon found their positions a bit too hot to retain and they all four took to the water for safety, whence they were speedily rescued by another competitor, "Piouit IV," the burning boat being promptly taken in hand by the torpedo destroyer, l'Epieu, which was in attendance upon the racers. No serious harm came to the "crew," but the boat was completely burnt out, the steel hull, after a considerable time, only remaining to tell the tale. The fire was finally extinguished in the bay by a good application of sand. A defective pipe was stated to be the cause of the disaster. Subsequently, she was re-hoisted into the Exhibition building, where, needless to say, she was a source of the keenest interest.

Owing to the upset created by the Parisienne disaster, it was decided to start the race again, and, therefore, at 10 o'clock the five remaining competitors were again sent off, the distance being reduced from 20 to 14 circuits ot the course, equal to 15 kiloms.

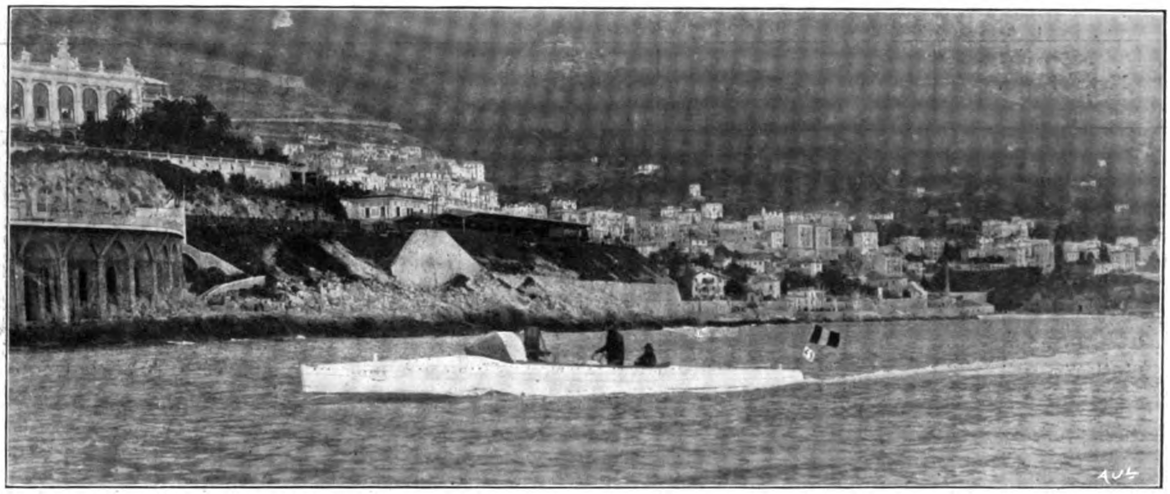
The Napier of 1903, which last year gained both the Harmsworth and the Gaston-Mernier Cups was almost as unfortunate in this event as its sister boat in the earlier race. During the 5th round, when she was travelling in splendid style, and keeping well ahead of Dubonnet, although not quite up to the speed of the ultimate winner, Lutèce, her pump went wrong, leaving only Lutèce and Dubonnet to fight out the race by themselves—the former's time for the 175 kiloms. being 5 hrs. 6 mins. 9 secs., and the latter a little over half an hour longer.

The cruisers for this dav were down for covering 100 kiloms., the prize falling to Vashy, fitted with a Delahaye motor, this craft covering the distance in 4 hrs. 25 mins. 18$\frac{4}{5}$ secs., all four of the starters getting over the full course well within the specified maximum time.

Saturday was fixed for the first of the handicap races for both the speed boats and the cruisers, and fully 8,000 of the public were massed on the terraces to witness the struggle. In the Racers seven



MONACO MOTOR BOAT MEETING.—The "Fleet" of Ader boats, viz., Allo I., II., III., IV., V., and VI., before the races.



MONACO MOTOR BOAT MEETING.—La Lutèce, the Winner of the event for the big Racers, covering 175 kiloms. in 5h. 6m. 9s.

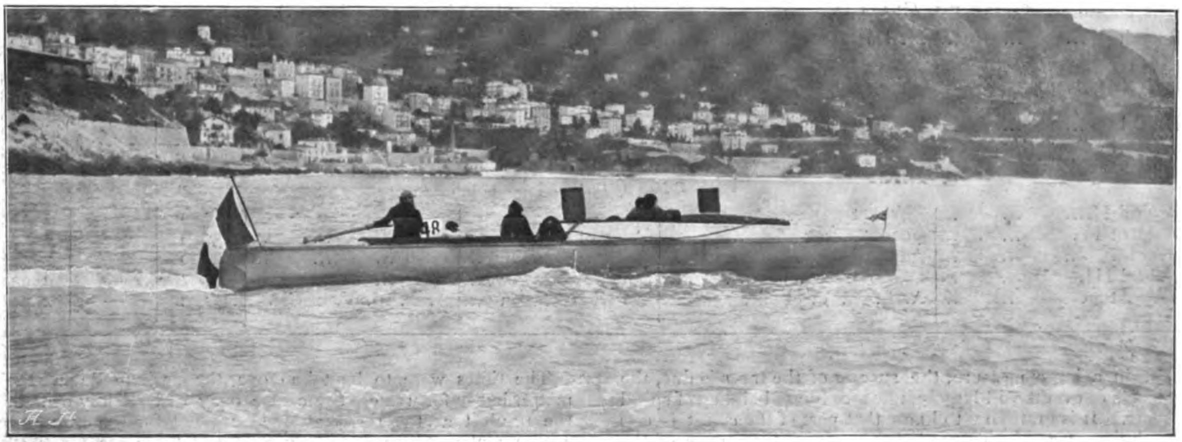
boats came into line for the start, and were sent off at their regular handicap interval times, commencing at 2 o'clock, Rapee II leading as the limit boat, followed a quarter of an hour afterwards by Charley's Mercedes II. The last of the craft to be dispatched was Trèfle-a-Quatre, this boat being handicapped by 30½ mins. That the handicappers had done their work well was evidenced in the most remarkable manner, as at the finish the whole of the competitors crossed the winning mark within 3 minutes. The last round brought excitement up to fever heat, when the whole seven boats were practically in a dead straight line making their final efforts to be first across the finishing line. The first four competitors actually finished the race within 1½ minutes, Charley's Mercedes with the net time for the 50 kiloms. of 1 hr. 32 mins. 20⅗ secs. being classed first, followed by La Rapee III. and Princesse Elisabeth. Trèfle-a-Quatre's time, the scratch boat, came out at 1 hr. 19 mins. 28 secs.

The cruiser handicapping was not quite so happy, but in one or two instances a certain amount of luck entered into the race, thereby somewhat discounting the times allowed by the officials. Le Nogentais, with the net time of 2 hrs. 57 mins. 38⅖ secs. for the 67·6 kiloms. was declared the winner in this race; 16 cruisers started and 14 arrived.

The second handicap was reserved for Sunday last, when in spite of a fine but penetrating rain, fully 10,000 or 11,000 visitors witnessed the events. The distance for the racers in this handicap was originally fixed at 200 kiloms., but owing to the strain of the week's events, it was decided to reduce this to 100 kiloms. A magnificent race ensued, in which Princesse Elisabeth came out triumphantly with a net time of 3 hrs. 14 mins. 53 secs. Lutèce, unfortunately, was put out of the running at the start by colliding with a vessel in the bay, and had to return to Monaco. Splendid travelling by Trèfle-a-Quatre was again a feature of the race, this boat steadily overhauling its rivals in the race, her time for the 100 kiloms. being 2 hrs. 51 mins. 14⅕ secs. As a matter of fact, the distance was a considerable amount in excess of the 100 kiloms., as during the night two of the buoys had shifted, and had to be replaced as near as possible to their original moorings, and there was little doubt that these were so placed that they increased the circuit somewhat in length, estimated by some to be nearly half a kilometre for each round.

Prior to the racers' handicap, the contest for ship's pinnaces, twice round the hexagonal course, a distance of 25 kiloms., was run off in dull and unpleasant weather. Five competitors started and completed the course, the winner being Bayard II, fitted with a Bayard-Clement motor; time, 1 hr. 41 mins. 14⅖ secs.

On Monday last all the racing craft which completed their full course in their respective classes took part in the speed mile and kilometre to which the magnificent cup of the Prince of Monaco was allotted. From the commencement of the meeting Trèfle-a-Quatre has been the popular favourite, and this splendidly-built craft upheld its reputation, securing first place in its heat against the Mercedes boat and in the final, beating in the latter both Lutèce and Rapee III., with a considerable margin to spare. The Trèfle's speed was at the rate of nearly 25 miles per hour. Both the builder of the boat, Mons. Seyler, and M. Brasier, whose motor was installed, have good reason to congratulate themselves upon the splendid success which their boat has achieved throughout the meeting. Tellier, the other crack French builder of racing hulls, has, as will be seen from our tables, a splendid set of boats to his credit, and no doubt, owing to the work of these clever craftsmen,



MONACO MOTOR BOAT MEETING.—Dubonnet, the other big Racer which disputed the prize with Lutèce.—Time, 5h. 36m. 43⅘s.

RESULTS OF THE MONACO MOTOR BOAT RACES.

Racers.

CLASS I.—*Length under* 8 *m.* (26·4 *ft.*), *max. cyl. capy.* 7·5 *litres* (*course* 150 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
					metres.	litres.	h. m. s.
1	La Râpée III.	M. M. Tellier	Panhard-Levassor	Tellier	7·98	7·36	4 33 22⅕
2	Princesse Elizabeth	M. M. Pirmez	Delahaye	Tellier	7·99	7·44	5 18 40
3	La Râpée II.	M. Avollée	Panhard-Levassor	Tellier	7·97	5·23	6 3 8⅕
	Le Perrot-Duval	de la Fresnaye	Rochet-Schneider	Lamplugh	7·99	—	2 rounds
	Peugeot I.	Soc. Aut. Peugeot	Peugeot	Pitre	7·96	6·30	1 round
	Titan II	Mestayer	Delahaye	Tellier	7·99	7·44	,,
	Allo VII.	Ph. Richmond	Aut. Ader	Pitre	7·99	7·36	,,

CLASS II.—*Length* 8–12 *m.* (26·4 *ft. to* 39·6 *ft.*), *max. cyl. capy.* 15 *litres* (*course* 200 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Tréfle-à-Quatre	G. Richard Brazier	G. Richard Brazier	Seyler	10·00	9·88	5 16 51⅗
2	Mercédès I.	M. Charley	Mercédès	Lein	9·99	6·78	6 39 27⅕
	Mercédès III.	M. J. Mercédès	Mercédès	Lein	10·19	12·72	11 rounds
	Napier Minor	S. F. Edge	Napier	Saunders	10·70	12·40	caught fire

CLASS III.—*Length* 12–18 *m.* (39·6 *ft. to* 59·5 *ft.*), *max. cyl. capy.* 30 *litres* (*course* 175 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Lutèce	M. Tellier	Panhard-Levassor	Tellier	14·93	13·67	5 6 9
2	Dubonnet	Marius Dubonnet	Panhard-Levassor	La Marguerite	12·42	27·86	5 36 43⅘
	Napier II.	Deutsch de la Meurthe	Napier	Hamilton	12·15	16·16	4 rounds

Cruisers.

CLASS I.—*Length under* 6·50 *m.* (21·4 *ft.*), *max. cyl. capy.* 2·5 *litres* (*course* 60 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	La Marguerite	J. Depret	Mutel	La Marguerite	6·48	2·22	3 22 23
2	Loodit	Despujols et Pinaud	Arbeille	Luce	6·50	—	3 22 23⅖
3	Allo I.	Birnbaum et Moulet	Ader	Pitre	5·50	1·81	4 59 39
4	Le Dauphin	Blanc	De Dion-Bouton	Armen. d' Antibes	6·50	2·07	4 59 47⅖
5	New York	Reaume	Lozier	Mathews	6·07	1·87	5 0 0
	Allo VI.	Pitre	Ader	Pitre	6·49	2·44	abandoned

CLASS II.—*Length* 6·50 *m. to* 8 *m.* (21·4 *ft. to* 26·4 *ft.*), *max. cyl. capy.* 3·75 *litres* (*course* 85 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Peugeot III.	Aut. Peugeot	Peugeot	Pitre	7·90	3·49	3 55 16
2	Titan III.	Desmarais	Delahaye	Pitre	8·00	3·73	4 4 41⅖
3	Arion II.	Fayaud	Filtz	Abel Le Marchand Vincent et Cie.	7·98	3·69	4 11 54⅕
4	Consul	Clément	Bayard	Luce	8·00	3·05	4 14 14
5	Peugeot II.	Aut. Peugeot	Peugeot	Pitre	7·99	3·49	4 14 20
6	Heraud	Heraud	Radium	Seyler	8·00	—	4 49 18⅕
7	Allo III.	Aut. Ader	Ader	Pitre	7·98	3·61	5 23 43⅕
8	Le Nogentais	Caillois	Darracq	Lein	7·94	3·49	6 5 15⅘
9	Moustique	Fabret	Beaudoin	Armen. d'Antibes	8·00	3·60	6 10 24⅘
10	Girondin	P. Chauchard	Renault	Abel Le Marchand Vincent et Cie.	—	—	7 14 30⅖

CLASS III.—*Length* 8·12 *m.* (26·4 *ft. to* 39·6 *ft.*), *max. cyl. capy.* 7·5 *litres* (*course* 100 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Vas-y	M. Jean	Delahaye	Pitre	10·50	7·44	4 25 18⅘
2	France	Comp. Armements Antibes	Beaudoin	Armements Antibes	—	—	5 23 29⅖
3	Usona II.	M.M. Fournier et Knopff	Lozier	Mathews	9·72	4·54	5 23 54⅕
4	Suzy	M. Meyan	De Dietrich	Guedon	—	—	5 48 58⅘

CLASS IV.—*Length* 12–18 *m.* (39·6 *ft. to* 59·5 *ft.*) (*course* 125 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Rotceh	M. Darmaros	Henriod	Armements Antibes	12·15	9·85	6 33 26

Fishing Boats (*course* 65 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Dalifol	Dalifol et Cie.	Abeille (alcohol)	Jamet	—	—	5 58 14

Pinnaces (*course* 25 *kiloms.*).

Place.	Name of Boat.	Owner's Name.	Type of Motor.	Builder of Hull.	Length.	Cylinder Capacity.	Time.
1	Bayard II.	Clément	— —	— —	6·59	—	1 41 14⅘
2	Peugeot IV.	Aut. Peugeot	Peugeot	Pitre	5·49	—	1 58 50
3	Allo II.	Aut. Ader	Ader	Pitre	2·00	—	2 52 0
4	Dalifol III.	Dalifol et Cie.	Abeille	Luce	4·97	—	2 22 2⅕
5	Sans Atout	A. L. M. V. et Cie.	De Dion-Bouton	A. L. M. V. et Cie.	5·52	—	2 54 59⅖

to which, in a large measure, the success of the races is due, the present series of events will largely influence future building of speed motor boats. It is gratifying to know that part of the credit is due to a British firm, viz., the Thornycroft Company, the screws of the Trèfle being made by that firm. The Thornycroft Company therefore secure the special prize of 1,000 francs, offered for the best screws employed on the winning boats.

The times were to be taken over the marine mile and the kilometre, but unfortunately the centre buoy had slightly drifted, with the result that the times attained are not for the exact distances contemplated. The times given in our table are for the actual distances covered between the buoys and the full course, these being measured afterwards by Lieut. Sauerwein.

Immediately after the races the winners boarded the Prince of

Handicap Races.

Place.	Name.	Time Allowance.	Actual Time.	Virtual Time.
	Racers (*course* 100 *kiloms.*).			
		h. m. s.	h. m. s.	h. m. s.
1	Mercédès II. ...	0 16 30	1 32 20⅗	1 15 50⅗
2	La Râpée III. ...	0 12 30	1 29 25⅗	1 16 55⅗
3	Princesse Elizabeth	0 13 0	1 30 42⅘	1 17 42⅘
4	Lutèce	0 2 30	1 20 27	1 17 57
5	Dubonnet	0 15 0	1 33 40⅗	1 18 40⅗
6	La Râpée II. ...	0 30 30	1 49 40	1 19 10
7	Tréfle-à-Quatre ..	scratch	1 19 28	1 19 28
1	Princesse Elizabeth	0 24 0	3 14 53⅗	2 50 53⅗
2	Tréfle-à-Quatre ...	scratch	2 51 14⅘	2 51 14⅘
3	La Râpée III. ..	0 22 0	3 15 58⅖	2 53 58⅖
4	Mercédès I. ...	0 28 30	3 23 57⅘	2 55 27⅘
5	Dubonnet	0 29 0	3 33 9⅗	3 4 9⅗
	Cruisers (*course* 67·6 *kiloms.*).			
1	Le Nogentais ...	1 3 0	2 57 38⅖	1 54 38⅖
2	Arion II.	0 38 0	2 57 56⅘	2 19 56⅘
3	Vas-y	scratch	2 35 7⅖	2 35 7⅖
4	Usona II.	0 43 0	3 25 5⅖	2 42 5⅖
5	France	0 32 0	3 21 0	2 49 0
6	Suzy...	1 3 0	3 43 32⅖	3 40 32⅖
7	Allo VI.	1 34 0	4 31 5	3 57 5
8	Peugeot II... ...	0 17 0	3 16 49	3 59 49
9	Heraud	0 49 0	3 58 20	4 9 20
10	Girondin	1 53 0	5 4 58	4 11 58

Prince of Monaco's Cup Race.

Place.	Name.	Time		
		For 2,852 m.	For 900 m.	For 1,952 m.
	1st Heat.	m. s.	m. s.	m. s.
1	La Râpée III. ...	4 47⅗	1 30⅖	3 17⅕
2	Princesse Elizabeth ...	4 52	1 31⅕	3 20⅘
	2nd Heat.			
1	Tréfle-à-Quatre ...	4 16⅘	1 19⅖	2 57⅖
2	Mercédès	4 58⅖	1 35⅘	3 22⅗
	3rd Heat.			
1	Lutèce...	4 28⅘	1 20⅗	2 57⅖
	Final.			
1	Tréfle-à-Quatre ...	4 17⅗	1 19	2 53⅗
2	Lutèce...	4 26⅗	1 22⅗	3 4
3	La Râpée III... ...	4 52⅘	1 31⅗	3 21⅕

Monaco's steam yacht, Princess Alice, where the formal presentation of the cup was made. The results of the day's racing are included in our annexed tables.

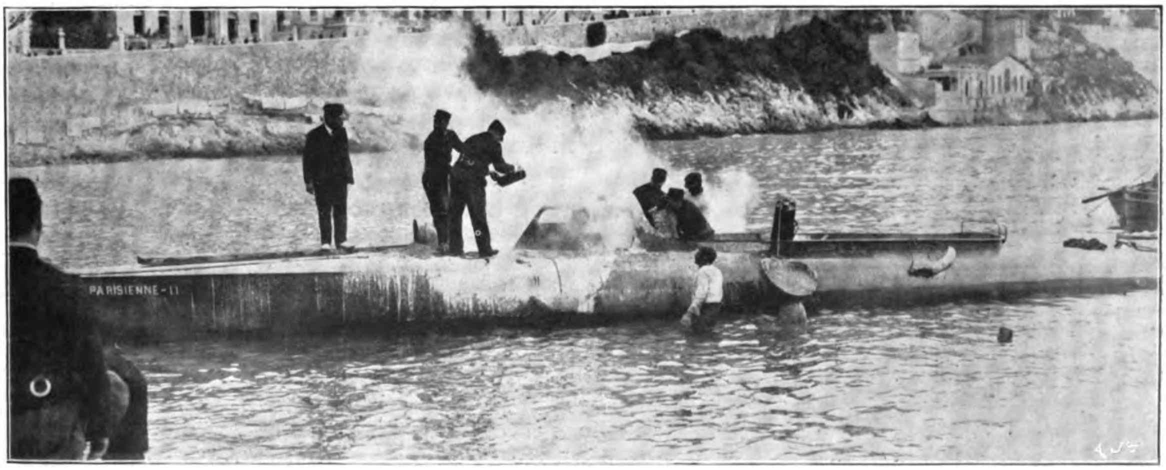
On Tuesday last the extra handicaps, voted last week by the International Sporting Club for the racers and cruisers, were successfully run off in splendid weather. These events were open to all the competitors in the previous races, except the winner of the mile and kilometre speed race, it being considered that by securing the Prince of Monaco's Cup for this event, the lucky owner should be satisfied. Trèfle-à-Quatre, therefore, was unable to participate in this day's racing. The handicap times were calculated upon the results of the other two handicap races. Only 4 racers took part and 12 cruisers. In the racers, Napier Minor, unfortunately, after getting away somewhat slowly, mistook the course and put about, thereby losing time. She pluckily, however, persevered, completed the course, and ultimately, notwithstanding the loss of time, secured third prize in 4 hrs. 53 mins. 19 secs. for the 125 kilometres. Titan II., which secured the first place, was timed for 4 hrs. 3 mins. 2 secs. In the handicap for cruisers, Peugeot was the winner in the net time of 1 hr. 38 min. 12 secs. for the course from Monaco to Nice and back. The results for the day are as follows:—

Special Additional Handicap.

Place.	Name.	Time Allowance.	Actual Time.	Virtual Time.
	Racers (*course* 125 *kiloms.*).			
		h m. s.	h. m. s.	h. m. s.
1	Titan II.	0 15 0	4 3 2	3 48 2
2	Princesse Elizabeth	scratch	4 31 0⅘	4 31 0⅘
3	Napier Minor ...	0 5 0	4 53 19	4 48 19
4	Amelie-Ancel ...	0 15 0	5 45 13⅘	5 30 13⅘
	Cruisers (*course Monaco–Nice and back*).			
1	Peugeot II. ..	0 33 0	1 38 12	1 5 12
2	Allo VI.	1 5 0	2 13 12	1 8 12
3	Allo III.	0 33 0	1 48 13	1 15 13
4	Titan III.	0 25 0	1 40 42	1 15 42
5	Vas-y	scratch	1 20 47	1 20 47
6	Le Nogentais ...	0 25 0	1 46 42	1 21 42
7	Arion III.	1 5 0	2 27 18	1 22 18
8	Consul	0 33 0	1 54 20	1 24 20
9	Usona	0 25 0	1 51 57⅕	1 26 57⅕
10	France	0 25 0	1 52 3⅖	1 27 3⅖
11	Giulia	scratch	1 29 17⅖	1 29 17⅖
12	Loodit	0 25 0	1 57 17⅖	1 32 17⅖

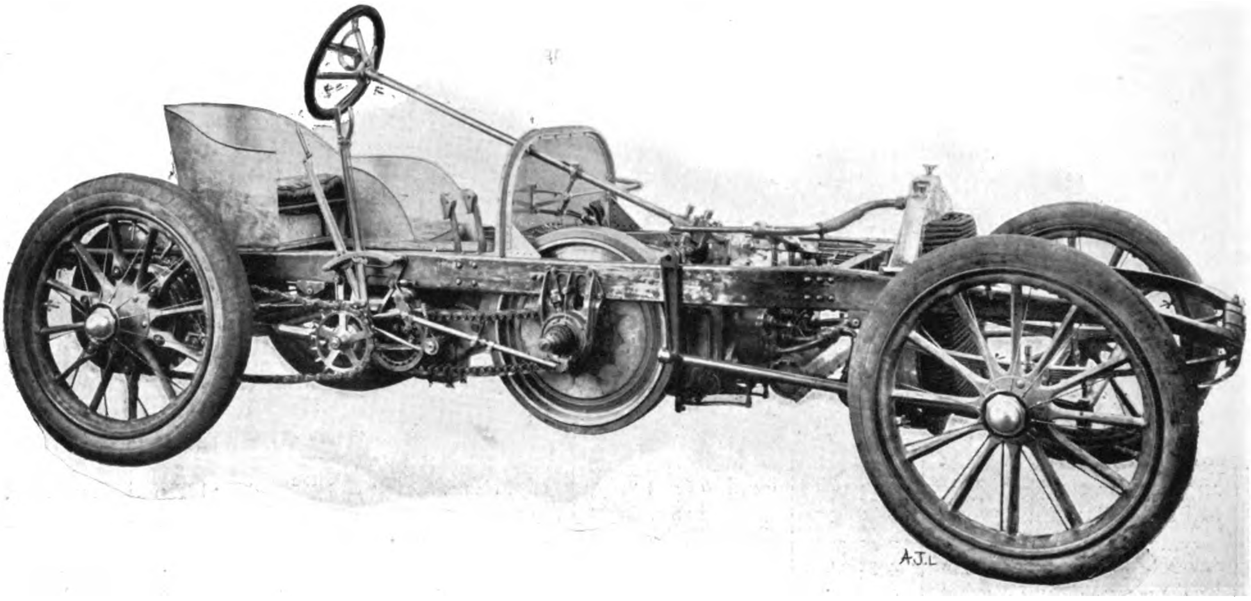
This day's racing concluded the meeting, and a congress was held amongst the competitors and the organisers of the event, when it was unanimously determined to repeat the meeting on an even larger scale for 1905.

A number of prominent owners at once entered for the next year's races, and during the week meetings were called for the purpose of determining the basis upon which the regulations are to be drawn up for the second year.



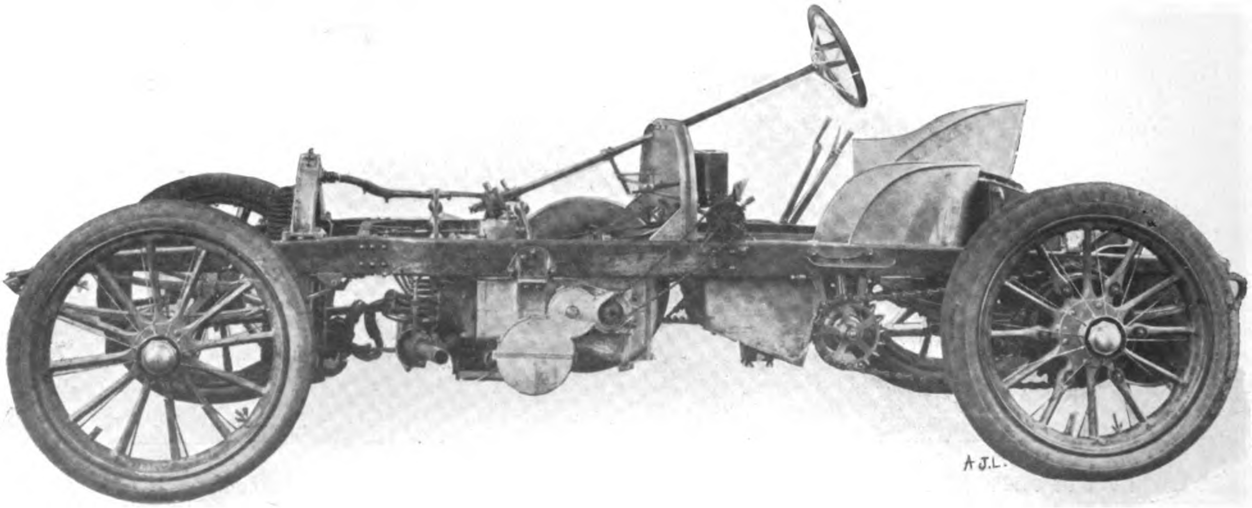
MONACO MOTOR BOAT MEETING.—All that remained of Parisienne II. after the conflagration on the sea. Final attentions in Monaco Bay.

THE 96-H.P. WOLSELEY GORDON-BENNETT RACER.



THE accompanying illustrations show the new 96-h.p. Gordon-Bennett racer, built by the Wolseley Company, to which we referred briefly last week. The chassis has a pressed steel frame, and it will be noticed that the wooden wheels are reinforced with wire spokes as on this company's 72-h.p. machine. The wheel-base is 9 ft., the track 4 ft. 7 in., the front wheels have 34 by 3½ in. tyres, and the rear tyres are 36 by 5 ins. The four horizontal cylinders lie alongside one another, and the engine is placed in the usual position adopted by these makers, with its crank-shaft lying transversely across the car. The end of the crank-shaft is carried by a ball-bearing, which is fixed to the frame in such a manner that it is unaffected by any springing of the frame, and this bearing steadies that end of the shaft outside the main clutch and the driving sprocket. High tension ignition plugs of extra large size are fitted horizontally into the cylinder heads, and the system employed in conjunction with these resembles that introduced by Messrs. Wilson and Pilcher, there being one coil, two tremblers—one of which is used only at a time—and separate test switches in each low tension circuit, besides spark-gaps in each high tension circuit. One of the Wolseley "automatic" carburettors, having a single jet, is employed for all four cylinders, and the engine is capable of running at any speed up to about 1,300 revs. per min. A large circular radiator, similar to that on the 72-h.p. car, forms the front of the bonnet and the pump is fixed to it, being driven from the motor by a telescopic shaft, in which is introduced a spring drive. The transmission-gear follows the usual Wolseley practice, and the gear-box, which is very compact, and is attached to the frame at three points only, is provided with ball-bearings throughout. The car is so geared that it will travel at a speed of about 75 miles per hour on the top-gear when the motor is running at its normal speed, but as already mentioned, the engine can be accelerated to 1,300 revs. per min.

Both sets of brakes act direct upon the rear wheels, those operated by foot being of the internal expanding type, and those controlled by hand being of the external "band" pattern.



THE WILSON-PILCHER PETROL CARS.—PART I.

Amongst cars of British design and British manufacture throughout, the Wilson-Pilcher vehicles are amongst the most interesting now on the market, owing to the fact that they have been developed upon distinctly original lines, and that the aims of the constructors have always been very high. Even the first Wilson-Pilcher car that made its appearance created quite a sensation in automobile circles at the time on account of its remarkably silent and smooth running, and of the almost total absence of vibration. This car was described by us in June, 1901, but since then many important improvements have been made, most of which have been referred to by us, more or less briefly, on different occasions. The latest cars are, as our readers know, now being manufactured by Sir W. G. Armstrong, Whitworth and Co., Limited, at Newcastle-on-Tyne. Two types of chassis are being built, the one having a 4-cylinder engine of 12 to 16 h.p., and the other a 6-cylinder 18 to 24-h.p. engine, but in general respects they are both similar, so that although the description which we are about to give refers more particularly to the larger model, yet it is also applicable in the main to the 4-cylinder car.

Many special features characterise the Wilson-Pilcher cars, so that it will, perhaps, simplify matters if we briefly enumerate the chief of these before considering the most interesting constructional details. The engine has horizontal cylinders, which are fixed on each side of a centrally-placed crank-chamber, and the cylinders on the one side are sufficiently out of line with those on the other side to allow the straight connecting rods to act upon separate crank-pins on the crank-shaft. The engine is rigidly fixed to the casing containing the change-speed-gear, so that these two portions of the mechanism form a single unit, which is suspended within the main frame. This unit is pivoted centrally at two points from above, so that it is capable of rocking sideways, to a certain extent, about these pivots, its weight primarily tending to hold it in its normal position in the middle of the frame. It is, however, also held in this normal position by a helical spring on either side in front, and by diagonal radius-rods which pass from it, at the back, to the ends of the rear axle. The helical springs are fixed at their outer ends to the side members of the frame, and the diagonal radius-rods are hinged at their rear ends only.

The gear-box contains a special form of main-clutch, and also two epicyclic change-speed-gears, the three lying one behind the other in line with the crank-shaft. These three mechanisms are so designed that no end thrust is imposed either upon their shafts or bearings when they are in use, and the operating mechanism is so arranged that the gear-box can be rendered dust-proof, and all the moving parts run in oil. The two epicyclic gears can either be used simultaneously so as to give a double-speed-reduction—the first speed—or can be used separately for giving the second and third speeds respectively. They are, therefore, made with different speed ratios, and when not in use revolve as though they formed a solid portion of the central shaft. When neither of these trains of gear are in use they both form solid portions of the through shaft, and thus for the fourth gear there is a direct drive through the gear-box from end to end. Either of the four speeds can be introduced by a single side-lever, which may be moved either forward or backwards in a quadrant having but

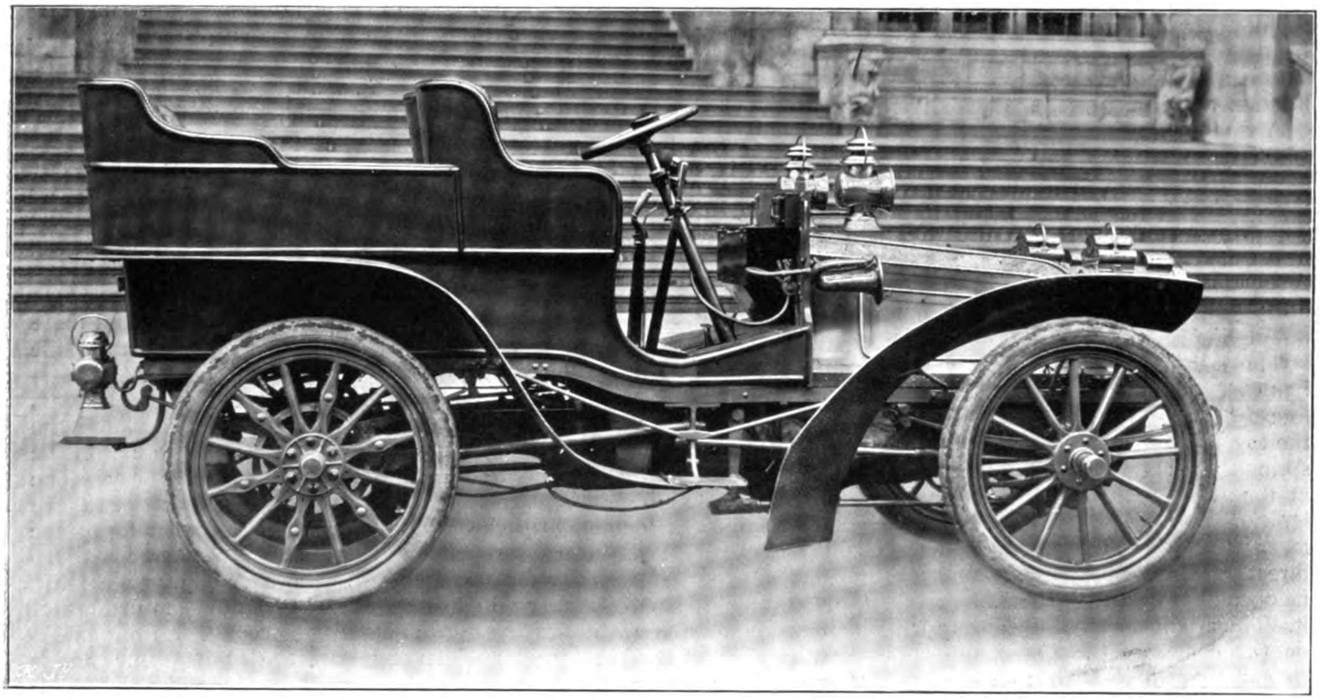


Fig. 1.—An 18–24-h.p. 6-Cylinder Wilson-Pilcher Car.

one slot. The lever has a second small hand-controlled catch upon it, and it is with this discriminating catch that the driver makes it either engage the first and the second, or the third and the fourth gears.

The construction of the main frame is unusual, partly because it provides the pivots for supporting the engine and gear-box, and also because radius-rods are fitted at each side from it to the front axle, as well as to the back axle—all four springs having shackles at both ends. The back axle is of the live type, the revolving portions of which are contained in an unusually large oil-tight aluminium casing. The reversing gear and the foot-operated brake-drum are both enclosed in this casing, the necessary "reverse" being obtained by mounting two large facing bevels upon the differential gear in such a way that either of them can alternatively be brought into mesh with the smaller bevel, on the end of the propeller-shaft.

Possibly the most noticeable characteristic of these cars is that all the gear-wheels that are used for the change-speed-gear, the bevel drive, and for the differential are of very interesting special construction, having helical instead of straight teeth, and it is to these that smoothness of running and absence of noise are in large measure due.

A very complete system of lubrication is adopted for circulating the oil through all the various parts of the car, a gear-driven pump being employed for this purpose, and the oil being filtered each time that it passes round. This system is distinct from the gravity sight-feeds that lead to each of the cylinders, but the small amount of oil that finds its way from them to the crank-chamber makes up for the small quantity that gradually escapes from the circulating system.

The speed of the engine is automatically controlled by two small hand-levers on the steering-pillar and by a foot-pedal that can be either depressed or lifted up by the toe. One of the hand-levers varies the strength of a spring that acts against the centrifugal governor, and it at the same time automatically advances the time of ignition as the normal speed is increased. The other lever "times" the ignition. The foot-pedal is connected direct with the governor, so that the throttle-valve can be opened or closed to the desired extent, irrespective of it. The arrangement of the governor—which is mounted on the centre of the cam-shaft—is peculiar, because it causes the whole shaft to slide lengthwise instead of merely sliding a sleeve upon the shaft.

Although these are the chief interesting features of the latest Wilson-Pilcher cars, yet there are many others which will be dealt with in due course in the more detailed description which we are about to give, and special notice, too, should be drawn to the ignition system employed, of which we gave very full particulars on March 7th last year. We would also call attention to the many instances in which very great ingenuity has been displayed in the details of design, especially for securing effective locking devices, in a simple manner, without employing set screws or other parts which are likely to shake loose.

An 18–24-h.p. complete car is shown in Fig. 1, and a chassis is seen both from the right-hand side and from above in Figs. 2 and 3. The 12–16-h.p. vehicles have four cylinders instead of six, but the cylinders themselves are identical with those on the larger vehicles. The lower powers mentioned in both cases are those which can be obtained on the road-wheels under average running conditions—hill-climbing—whilst the higher powers mentioned are those developed by the respective engines on the brake, when running at a speed of 1,000 revs. per min.

Fig. 4 shows the engine in place in the chassis from the right side, Fig. 5 shows the left-hand side of it (removed from the chassis), and Fig. 6 is a view of the central portion of the chassis looking forward from the left side; these illustrations, in conjunction with Figs. 1, 2, and 3, will enable the general construction of the car to be seen.

The main frame is constructed of channel steel, and the side members are so shaped that they are nearer together, and are at a lower level, in front than behind. These members are stiffened by ties, as seen in Fig. 2, and from them an inner framework springs across above the gear-box, as seen in Fig. 3. Above the engine, too—passing from beneath the dash to the front members of the frame—are two channel members which are bent up to a higher level, and are connected across to carry a rocking beam, A. A similar rocking beam, A^1, lies above the gear-box, and it is to the ends of these two beams that the engine and the gear-box, J, are suspended by downwardly projecting links. Passing from the rear end of the gear-box, and fixed to it, are two radius-rods, A^3, the other ends of which are pivoted to the usual side radius-rods, A^2, that connect the frame with the ends of the back axle. The junctions of the rods, A^2 and A^3, are slightly forward of the axle itself. These four rods allow for the free play of the side springs, whilst the inner pair, A^3, tend to restrain the gear-box from rocking with the beam, A^1. The engine is connected direct across to the side members of the frame by a strong helical spring, A^5 (visible in Fig. 4), each side, and these springs restrain the movements of the engine about the pivot, A.

The front springs of the car have shackles at either end, arranged in the same way as the back springs, and the radius-rods, A^4, serve to keep the axle square with the frame, whilst allowing the springs to have free play. The differential gear, and the bevel wheels driving it, are enclosed in the aluminium casing, N, that forms the stationary part of the back axle. The power is transmitted to the axle by a universally-jointed propeller shaft, which is enclosed in a leather casing, as seen in Figs. 2, 3, and 6, from the change-speed-gear. The front axle is a solid forging which is bent down at its centre and is bifurcated at its ends to form the steering heads. This 6-cylinder car has a wheel base of 8 ft. 8½ ins., and the track is 4 ft. 8 ins. The wheels are of the usual artillery type and are shod 910 mm. pneumatic tyres—those in front are 90 mm. across, and the rear tyres are 105 mm. wide.

The engine has a long square crank-chamber to each side of which are bolted three cylinders, B, the bolts passing right across from side to side, and none of the cylinders being quite opposite one another. The cylinders are fitted with atmospheric inlet-valves on the upper side, and with exhaust valves—which are easily removable, together with their seats—on the under sides. The inlet-valves are held down in place by the covers, B^1, which form a part of the branched induction pipes, B^2, each cover being secured in place by a yoke and a pair of nuts, as seen in Figs. 4 and 5. The carburettor, E, is fixed at the rear end of the engine, to one side of the crank-chamber, and is of much the usual float-feed spray type. A supply pipe, B^6, is led from it to a casting, G^7, above the crank-chamber, which contains a special form of balanced throttle-valve, and the induction pipes,

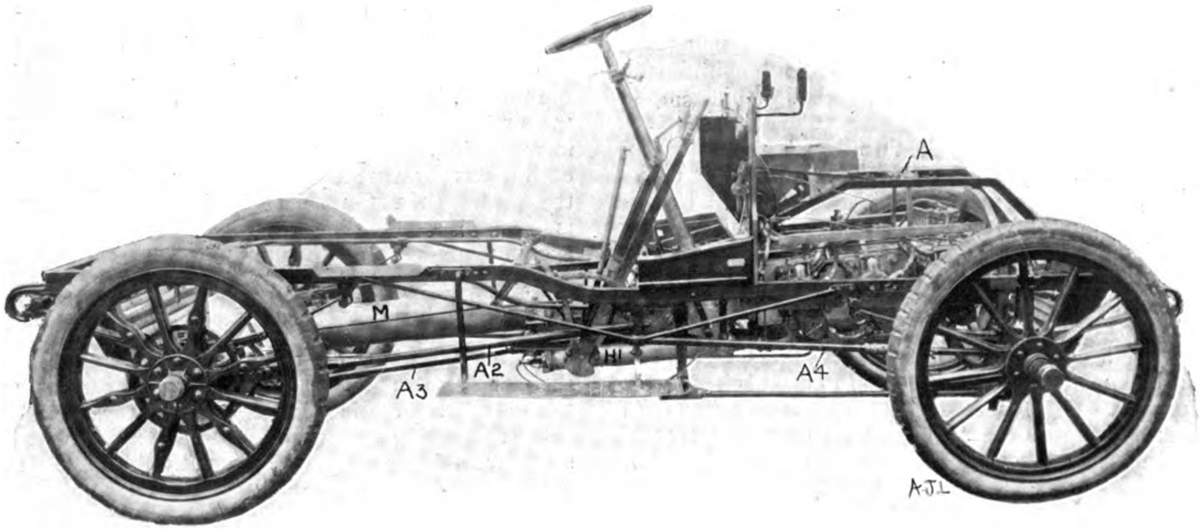


FIG. 2.—View of the Wilson-Pilcher 6-Cylinder Chassis from the Right Side.

B^5, are led from it to all six cylinders. The supply pipe, B^6, is connected to the casting, G^7, by a valve-fitting which contains two (unequally spring-loaded) automatic auxiliary air-valves, B^7, that tend to maintain a constant richness of mixture by admitting a greater quantity of diluting air as the speed of the engine increases, and there is also a hand-controlled valve, B^4, which can be operated by the driver, and is for this purpose connected with a small sliding rack, B^9 (Fig. 4), that passes through the dash.

Each of the exhaust-valves, together with its seat-casting, is held in place by a pair of nuts and a yoke, the yoke being slotted so that it is only necessary to slacken the nuts in order to remove the complete valve. The exhaust-pipes, H, are made of flexible tubing, and those for each set of three cylinders are led to separate compartments of the aluminium exhaust-box, H^1, which is fixed beneath the gear-box. Valves are fitted into each of these compartments, and they are controlled by Bowden wires from the small levers, H^2, which are seen on the dash in Fig. 6, the driver being thus able to allow the exhaust from either set of cylinders to find its way direct to the atmosphere when he wishes to ascertain whether all the cylinders are firing regularly or not. Normally the exhaust gases from each of these first compartments are subsequently allowed to mix together in another portion of the exhaust-box before they ultimately escape. Inspection covers, B^3, are screwed into each cylinder-casting opposite the exhaust-valve, and similar plugs are also fitted into the ends of the cylinders. Each cylinder-casting forms a water-jacket around the cylinder wall and the head.

The crank-shaft, D, has six crank-pins, and is supported by two intermediate bearings as well as by those at either end of the crank-chamber. The flywheel, D^1, is fitted at its forward end, and a flange, D^3, by which it is bolted to the clutch at its other end. The flywheel is of large diameter, though it is by no means heavy, and its arms are so shaped that the rim lies back and encircles the end of the crank-chamber. The cam-shaft is placed

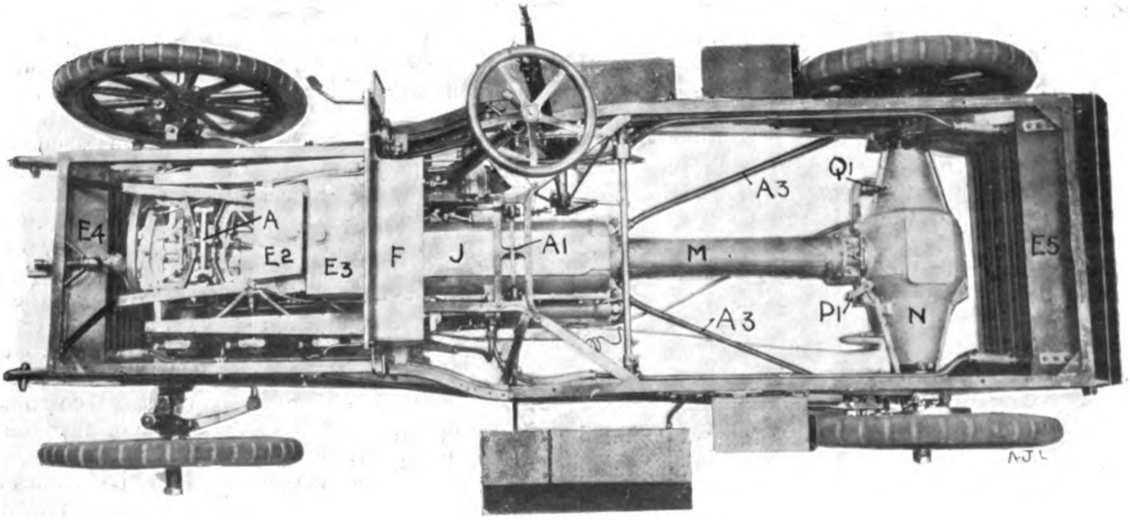


FIG. 3.—View of the 18–24-h.p. Wilson-Pilcher Chassis from Above

beneath the crank-shaft, and carries three cams for operating the six exhaust-valves, these cams being unusually wide to allow the shaft to be slid longitudinally in its bearings by the governor, which is mounted upon it.

The governor acts upon the throttle-valve contained in the casting, G^7, by sliding the cam-shaft along in its bearings, and the cam-shaft is normally held so as to resist the action of the governor by a spring pressing against its forward end. The strength of this spring can be varied by the driver from the steering pillar, the hand-lever, G^3, being fitted there for this purpose. The lever, G^3, is connected with a pivoted beam, G^2, which is visible in Fig. 4, the other end of this beam acting upon the governor-spring. Carried upon this beam, G^2, is a pin, F^4, which acts as a fulcrum for an upper beam that forms a part of the "timing" mechanism. By this arrangement the driver can regulate the normal speed of the engine by varying the strength of the governor-spring, and at the same time that he does so, he interferes with the timing of the ignition, the effect being that ignition occurs earlier as the normal engine speed is increased, and *vice versâ*. He is also able to control the engine speed by a foot-pedal, G^6 (Fig. 6), which acts direct upon a lever, G^4 (Fig. 4), that forms a part of the connection between the sliding cam-shaft and the throttle-valve. The rods, G^5, connecting this lever with the pedal, G^6, are clearly visible in Fig. 4, where it will be noticed that small compression springs are introduced between the long rod, G^5, and the end of the lever, G^2, to prevent any damage being done if the pedal, G^6, were depressed too violently. The pedal has the effect of suspending the action of the governor, either to increase the engine speed, if it is raised, or to decrease it, if depressed, and thus quick accelerations or retardations can be effected without interfering with the lever, G^3, on the steering pillar.

The ignition plugs, B^2, are screwed at an angle into the cylinder heads, and the wires leading to them from the coil-box, F, behind the dash, are carried in neat wood casings. For the benefit of those who are not already acquainted with the Wilson-Pilcher ignition system a brief explanation may be useful. A single trembler fitted inside the box, F, is so connected up with the commutator and the six coils that the current passes through it to each coil in succession. The un-"earthed" high-tension terminal of each coil is permanently connected with its igniter, and—the windings of all four coils being identical—synchronism is ensured so long as the distributing commutator is accurately made. The commutator has six insulated and equidistant contact blocks, inside which revolve the contact-making brush. The coil-box has, as a matter of fact, two tremblers, each of which is energised by its own electro-magnet, but only one of these is used at a time, and there is a two-way switch for throwing over from the one to the other. A defective trembler can thus be adjusted without stopping the engine, and the employment of the single trembler renders the usual, troublesome "tuning up" operation unnecessary. Six small switches are fitted in the coil-box, so that either coil can be cut out for testing when desired, and in conjunction with these switches are fitted spark gaps, which give a very good indication of the proper operation of every coil.

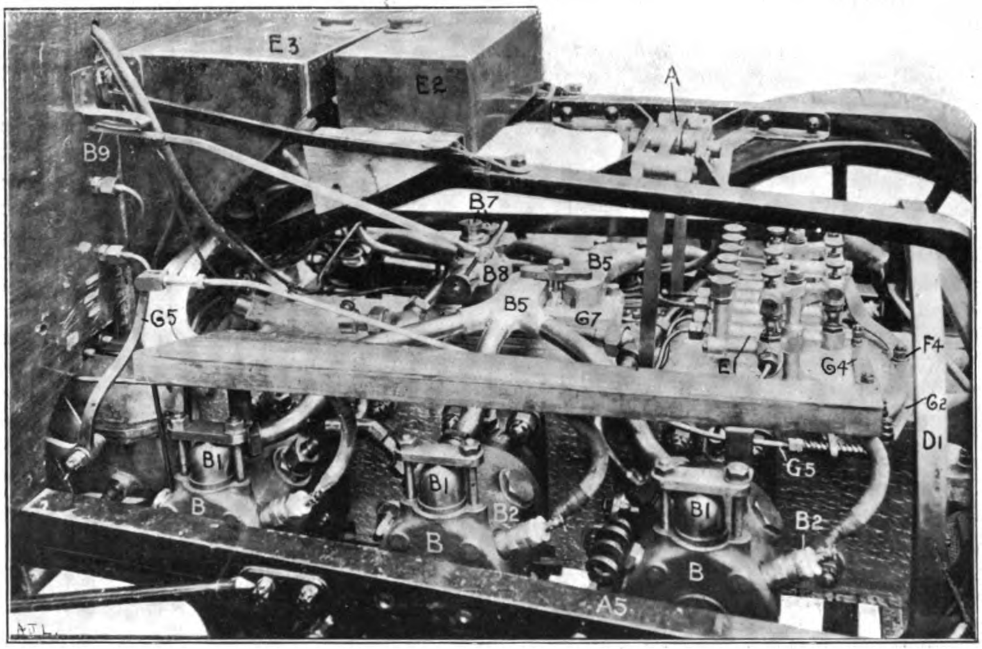


FIG. 4.—View of the 6-h.p. Engine in the Wilson-Pilcher Chassis (from the Right Side).

The commutator, F^1, is not visible in Figs. 4 or 5, but can be seen in Fig. 6. It is mounted on the end of a short shaft that projects through the side of the gear-box, and is driven by spiral gearing from the crank-shaft—the wheel, D^3, on the crank-shaft, which drives it, is seen in Fig. 5. The time of ignition is varied by the lower hand-lever, F^2, on the steering pillar, although, as we have already said, the lever, G^3, also varies the time of ignition—the connection between the lever, F^2, and the commutator, F^1, being taken round the front of the engine, through the lever fulcrumed at F^4, and back again to the commutator. A very neat combined voltmeter and switch, F^3, is fixed on the dash to the right of the coil-box. A removable key fits into the keyhole on the underside of the instrument and it operates the two way switch that brings either of the accumulators into use; a press-button is also fitted above the instrument for

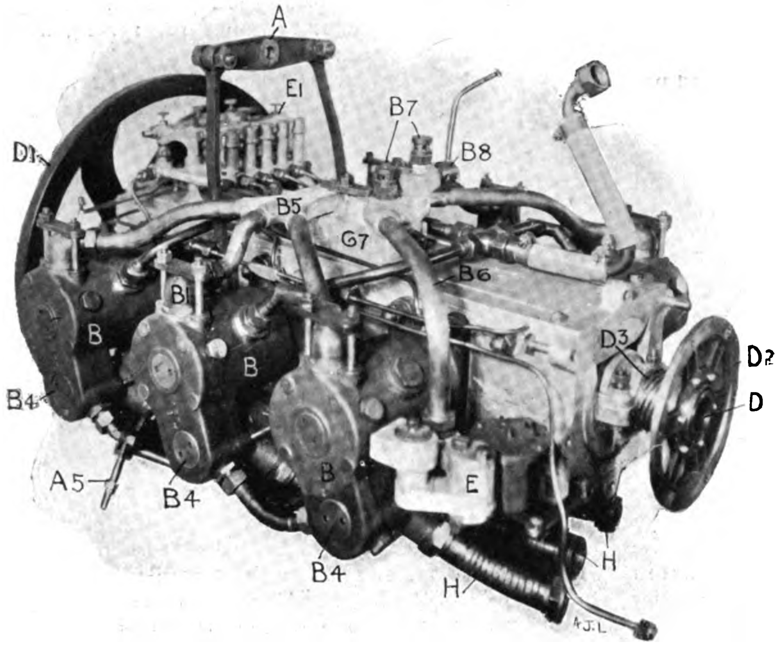


Fig. 5.—The 6-Cylinder Wilson-Pilcher Engine (Left Side).

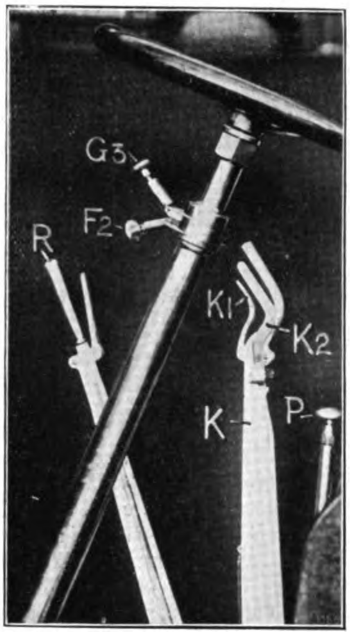


Fig. 7.—View of the Hand-Levers on the Wilson-Pilcher Petrol Car.

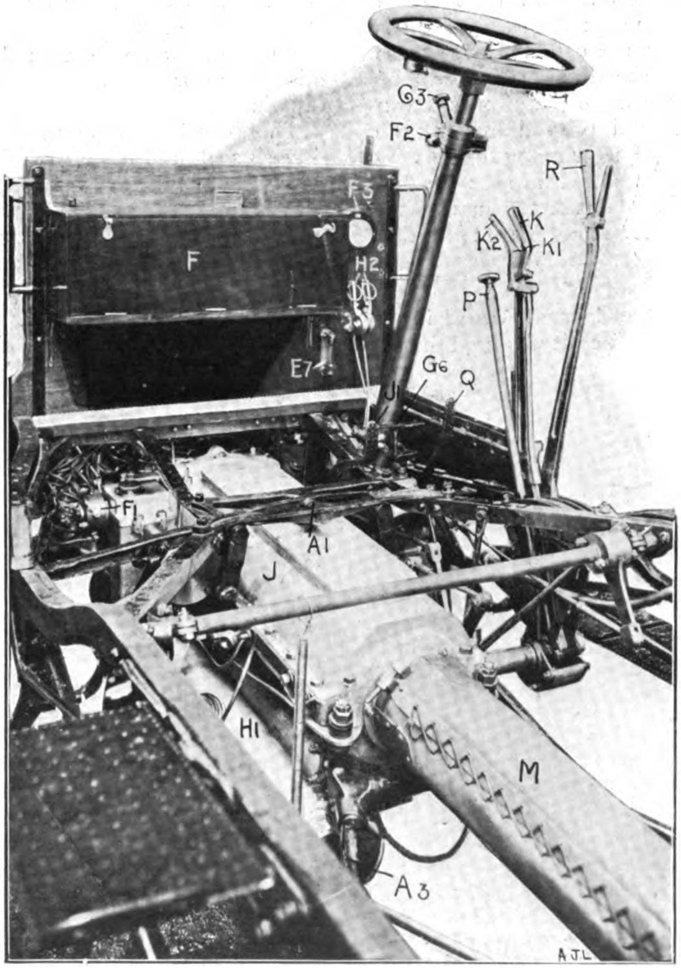


Fig. 6.—Central Portion of the Wilson-Pilcher 6-Cylinder Chassis, showing the Regulating Levers and Pedals, the Gear-Box, and the Dash.

coupling up the voltmeter to give a reading. The key that operates the two-way switch is removable, but can only be taken away when the switch is off.

Two radiators, E^4 and E^5—the one in front, the other behind—are employed for cooling the circulating water, and there is also a water tank, E^3, fixed in front of the dash, which forms a part of the circulating system. The water flows from the tank through one radiator after the other to the pump, and the pump forces it back through the cylinder jackets to the tank. The pump, E^6, is of the eccentric type in which there is one sliding vane pivoted in the casing. It is driven by bevel gear off the shaft that carries the commutator, F^1.

The tank, E^3, and the radiators, E^4 and E^5, have a joint capacity of about 3½ gals.

The bearing surfaces in the engine are lubricated by the same system that continually feeds oil to the change-speed-gear, and to the back axle, this system comprising a circulating pump—driven off the same shaft as the water pump—that draws the oil from the bottom of these mechanisms, and keeps it circulating through them; the pump is of the plunger type. The cylinders themselves, however, are lubricated by a sight-feed fitting, E^1, which is fixed above the crank-chamber, and is fed with oil from a separate tank, E^2. The pistons receive a certain amount of oil from the splash in the crank-chamber, but the sight-feed fitting allows the precise quantity that reaches them to be adjusted, and part of this external feed finds its way into the crank-chamber, and thus replenishes what may be lost from the circulating system. A small indicator, E^7, is introduced into the forced lubrication circuit to show whether the pump is working properly or not. It merely consists of a short gauge - glass through which the oil should be seen to pass. A filter, too, is introduced into the system.

The cylinders have a bore of 3¾ ins., and the stroke, too, is 3¾ ins. The engine is intended to run at any speed between 200 and 1,200 revs. per min., and it developes about 24-b.h.p. at 1,000 revs. per min.

Although the transmission-gear on this car differs very materially from that on other vehicles, yet the levers and pedals by which it is operated are arranged in almost exactly the same way. The pedal, J^1, to the left of the steering-pillar withdraws the main clutch when pressed forward, and the pedal on the right of the steering-pillar applies the brake on the differential gear. A neat catch is provided for holding the clutch out of engagement when desired, for which purpose a slight amount of side play is provided for the pedal. The pedal need only be pressed forward to a greater extent than usual, when it will be held there by the catch. The engine can then be allowed to run quite freely, and it is only necessary to force the pedal slightly to the left to again free it.

The change-speed-lever, K, has—as best seen in Fig. 7—two small catch handles, K^1 and K^2, instead of only the usual one. The hand-catch, K^1, engages with notches in a quadrant, but the handle, K^2, which is on the inner side of the main lever, operates in a very ingenious manner to cause the gear-lever to introduce either the first and second or the third and fourth speeds, as it is forced forward and drawn rearwardly, respectively. Ordinarily, when the handle, K^2, is not gripped by the driver, the third speed will be brought into play when the lever is moved forward and the fourth speed when it is moved backward. If, however, the catch-handle, K^2, is also gripped by the hand, then the second speed will be brought in instead of the fourth when the lever is drawn rearwardly, and if still gripped and pressed forward the first speed will be introduced. The gripping of the side-catch, K^2—or not—determines whether a lower gear or a higher gear will be introduced when the main lever is being shifted forward from the second speed position or backward from the third speed position. The gears provided are equivalent to about 10, 15, 24, and 38 miles per hour respectively.

A separate hand-lever, P, is used for the reverse, this lever causing the large bevel wheels, which are fitted to the differential-gear, to slide longitudinally, so as to bring either the one or the other of them into mesh with the driving bevel-wheel. The rod connecting the hand-lever, P, with the pivoted lever, P^1, on the casing, N, is not shown in Fig. 3, but it passes direct from the one to the other, and has ball joints at either end.

The brakes which act upon the hubs of the rear wheels, and have metal to metal—cast-iron on steel—friction surfaces, are operated by the hand-lever, R, and are applied by drawing the lever backwards towards the driver. They are compensated in a very ingenious manner. The rods to each of the brake-bands pass from the ends of the cross tube, which is seen lying across the frame in Fig. 6. The hand-lever is connected by a rod with a lever mounted freely on this tube, and through the boss of the lever pass loose pins, having small balls turned on each end, the balls resting in cavities in flanges that lie on either side of the boss. Each of the flanges is fixed to a sleeve, by which one of the brakes is operated, so that when the pressure is exerted on the lever the pins equalise the pull on the two brakes. The foot-operated-brake is of the band type, and has metal to metal (copper and steel) friction surfaces which work in oil. It is applied by a rod which connects the pedal, Q, with a lever, Q^1, on the back axle, but this rod was not fitted when our photograph (Fig. 3) was taken. Neither this brake nor the hand-brake are inter-connected with the clutch.

The petrol tank on these cars is fixed beneath the driver's seat, and has a capacity of about 18 gals. The accumulators, for the ignition, are also fixed beneath the front seat.

(*To be continued.*)

FOLLOWING the decision by the Court of Appeal in the case of Sanderson *v.* Collins, in which it was held that an owner was not liable for damage done by his servant using, without his authority, a vehicle lent to him temporarily whilst his own carriage was being renovated, the Institute of British Carriage Manufacturers have issued a recommendation to all coachbuilders to print on their letter paper and bill-heads the following intimation:—

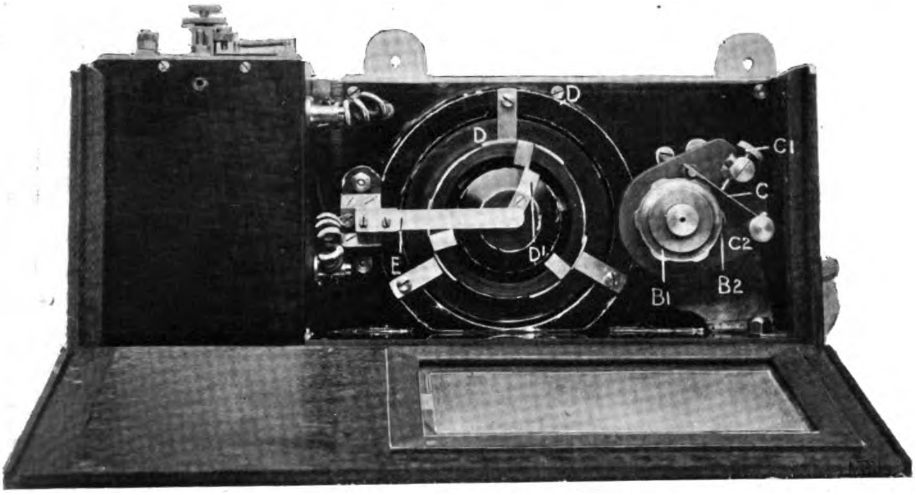
> "All vehicles let or lent from this establishment are so let or lent upon the understanding that they are returned in the same condition as when received by the customer, fair wear and tear excepted."

As the same law will unquestionably apply to automobiles it is an important point to note by manufacturers and agents.

MR. C. B. FRY, whose new magazine we drew attention to in our last issue, was presented last week, at a bazaar held at Brighton in aid of the Sussex County Cricket Club funds, with a 12-h.p. Darracq car, by the Hon. Mrs. Campion, as a present from the members of the County Club and friends in recognition of his brilliant cricket for Sussex. In returning thanks for the very welcome recognition of his magnificent work, he mentioned that he had travelled down on the car to Brighton in about two hours, escaping various wayside difficulties, including police traps, &c. Amongst the police traps avoided was no doubt the electric arrangement on the Brighton road, between the 38th and 40th milestones, where on a tempting downhill grade a measured furlong has been carefully marked out by the Surrey trappists. Which beware!

GRADUALLY the many contradictions and the absurdities in the 1903 Motor Car Act, that offspring of the union of prejudice and panic, are becoming apparent. The magistrate of the South Western Police Court recently pointed out one of them. An automobilist was summoned before him for not having a lighted lamp, which had apparently been extinguished accidentally during his run. He was, of course, convicted, though only fined the moderate sum of 10*s.* and 2*s.* costs, but on defendant pleading that his license should not be endorsed the magistrate observed that the wisdom of Parliament had given him no choice in the matter. If a person were convicted for driving at 100 miles an hour his license need not be endorsed, but if he commits any other offence under the Act it must be. We believe the learned magistrate is substantially correct in his ruling, as, after carefully perusing Section 4 of the Act, it certainly seems that the Court which convicts has no option in the matter, except in the case of a first or second offence for exceeding the speed limit.

THE NAPIER IGNITION APPARATUS.

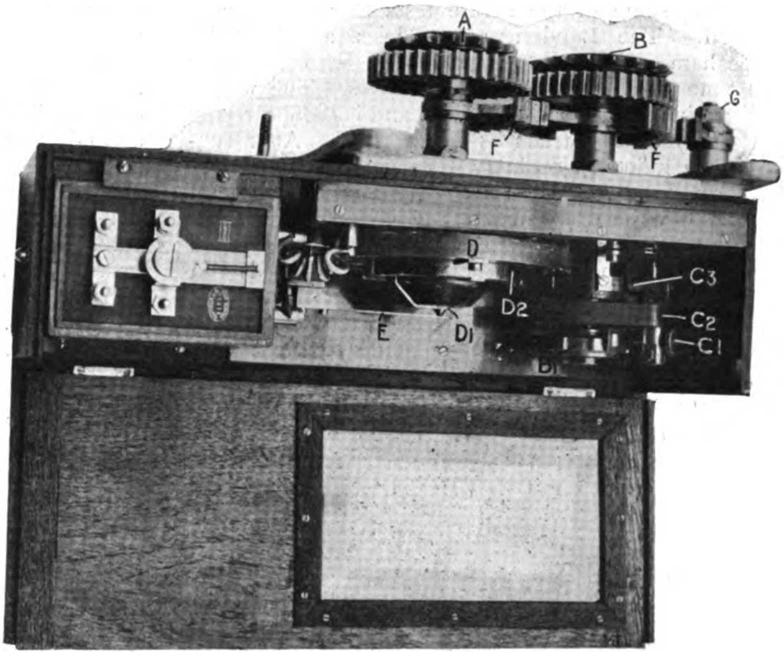


Following the brief general description of the single-coil synchronised ignition system, which has been adopted by the Napier Company on their vehicles this year, we now give two illustrations showing the construction of the apparatus, the whole of which is enclosed in a neat case that is fixed to the dashboard of the car. This apparatus has two separate shafts, A and B, that are driven at the same speed as one another by the engine, and are caused to revolve once for every two turns of the crank-shaft. These shafts project through the dashboard, and each of them carries a sprocket-wheel and a spur-wheel at its forward end, beneath the bonnet. The sprocket on the shaft, A, is connected with a similar sprocket on the engine, and the power is transmitted from this shaft to the other shaft, B, through the spur-wheels; the sprocket on the shaft, B, is merely provided for driving the mechanical lubricator on the car by another chain. Both shafts at their other ends are used for distributing the electric current, the shaft, A, alternately connecting the high-tension terminal of the coil with the ignition plugs on each cylinder, and the other shaft, B, carrying a cam, B^1, that makes and breaks the primary low-tension circuit to the coil.

The coil, together with these electric distributors, is fitted inside a rainproof wooden case, having a glass window in front, as seen in the illustrations, which show the apparatus from the front and from above.

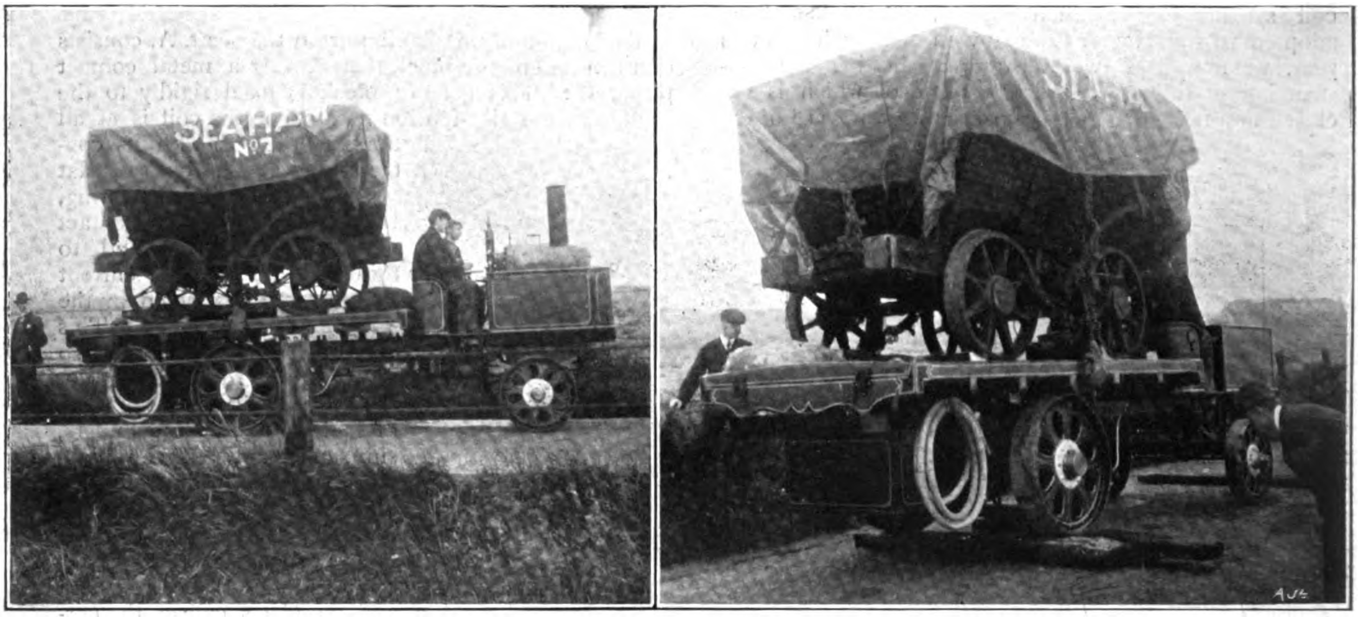
The apparatus shown is designed for use with a 6-cylinder engine, the cam, B^1, having six projectors, B^2, which—coming in contact with a small roller on the flat spring, C—complete the electrical circuit between that spring and the platinum pointed screw, C^1, each time that a spark is required in any of the cylinders. The coil itself is fitted with its own trembler, so that this low-tension make-and-break device is not really essential, since the trembler on the coil might be allowed to work continuously. Its employment, however, effects a considerable saving in the amount of current that is used.

The high-tension distributor on the shaft, A, consists of a central ebonite block that carries a metal contact piece, D^1. This ebonite block is fixed rigidly to the shaft, and the high-tension terminal of the coil is at all times connected with its contact piece, E^1, by the flat spring, E. An ebonite ring, D^2, is fitted with three contact plates on either side, and to these the high-tension current is alternately conducted by the revolving contact, D^1. This ring, D^2, is itself mounted so that it can be rocked about the shaft, A, for varying the time of ignition to all six cylinders, simultaneously, but the high-tension wires leading to the ignition-plugs are allowed to remain stationary because they are connected to plates on an outer fixed ring, D, and the plates collect the current from those on the ring, D^2.



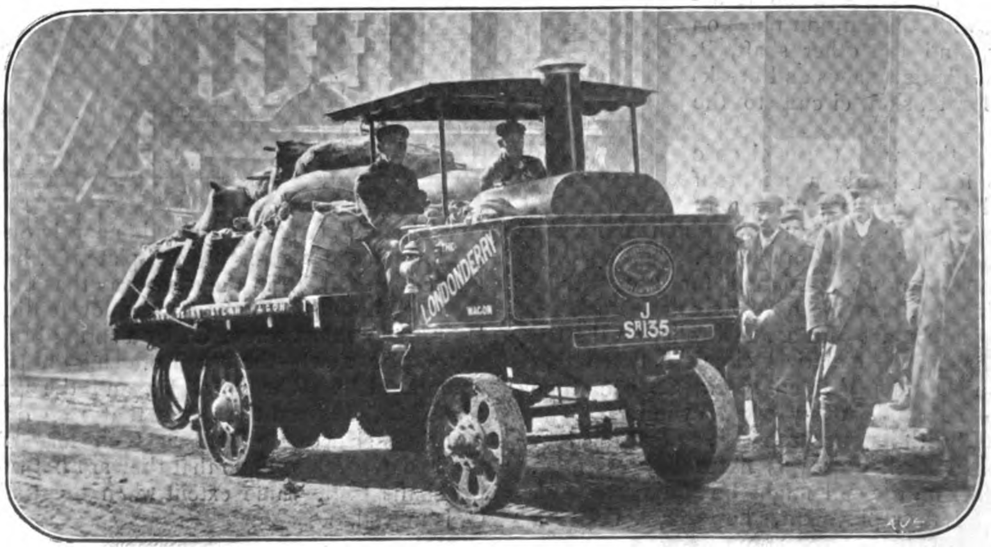
"Timing" is effected simultaneously on both shafts, the low-tension "commutator" plate, C^2, being mounted about the shaft, B, in the same way that the ring, D^2, is mounted about the shaft, A; the low-tension current is led to the contact screw, C^1, by a spring brush, C^3 (seen in the plan view)—the brush pressing on the stationary contact plate. The ring, D^2, and the "commutator-plate," C^2, are fixed to sleeves that ride on the shafts, and these sleeves are fitted at their forward ends with toothed quadrants, F, so that they are both rocked about the shafts to the same extent when the timing spindle, G, is moved.

THE LONDONDERRY STEAM WAGONS.



THE above illustrations show one of the first 4-ton Londonderry steam wagons which has been constructed, undergoing some of the severe tests to which it was subjected. The Londonderry vehicles are built by the Seaham Harbour Engine Works, who have for some time made their own locomotives. The wagon itself weighs 2 tons 18 cwt. 1 qr., and is seen carrying an ordinary railway truck as its full load. After running seven miles on ordinary roads in one hour, we are informed that it easily took its load up an incline of 1 in 7. On the same incline the brakes were afterwards tested, proving that the vehicle could be stopped within its own length. The wagon was afterwards run with one road wheel only on railway sleepers laid along the road, after which six sleepers were placed at intervals across the road, and the wagon made to travel over them, as seen in our second illustration. The wagon appears to have undergone these trials without sustaining any damage, and to have proved itself thoroughly satisfactory under all conditions. A water-tube boiler is used, and it is so constructed that the whole of the water space can be cleaned out by taking off the end plates when necessary; the heating surface is 120 sq. ft. The ash-pan can be raised and lowered, facilitating lighting the fire and cleaning. The driving axle is carried in axle boxes which are carried on spiral springs and take the whole weight of the load. It is gear-driven, and the axle boxes are steadied in guides, which are so shaped as to keep the gear-wheels properly in mesh. The engine has two high pressure cylinders, and the slide valves are so arranged that the cut-off is variable. The gearing provides for two speeds; sufficient water is carried for twelve miles. The platform area is 12 ft. by 6 ft. 4 in., the platform is 4 ft. from the ground, the wheel base is 11 ft., and the over-all length is 18 ft. 6 in.

Our other illustration shows one of these steam lurries, climbing Side — a well-known hill in Newcastle.



IDENTIFICATION MARKS FOR MOTOR CARS.

Probably very few of the general public have any idea of the "home" of a motor car which carries any other significant letter than that assigned to their own locality. The full official list of these registration letters has previously appeared in this journal, but it was then arranged alphabetically under the initial letters of the towns. For the convenience of identification we publish herewith another complete list, but analysed alphabetically under their registration letter. Anyone possessing this list will, therefore, readily be able to identify the locality in which any car has been registered.

A.	London
A.A.	Southampton
A.B.	Worcester
A.C.	Warwick
A.D.	Gloucester*
A.E.	Bristol
A.F.	Cornwall
A.H.	Norfolk
A.I.	Meath
A.J.	Yorks (N.R.)
A.K.	Bradford
A.L.	Nottingham*
A.M.	Wilts
A.N.	West Ham
A.O.	Cumberland
A.P.	Sussex, East
A.R.	Hertford
A.S.	Nairn
A.T.	Kingston-on-Hull
A.U.	Nottingham†
A.W.	Salop
A.X.	Monmouth
A.Y.	Leicester*
B.	Lancaster
B.A.	Salford
B.B.	Newcastle-on-Tyne
B.C.	Leicester†
B.D.	Northampton*
B.E.	Lindsey, Linc.
B.F.	Dorset
B.H.	Bucks
B.I.	Monaghagan
B.J.	Suffolk, East
B.K.	Portsmouth
B.L.	Berks
B.M.	Bedford
B.N.	Bolton
B.O.	Cardiff
B.P.	Sussex, West
B.R.	Sunderland
B.S.	Orkney
B.T.	Yorks (E.R.)
B.U.	Oldham
B.W.	Oxford*
B.X.	Carmarthen
B.Y.	Croydon
C.	Yorks (W.R.)
C.A.	Denbigh
C.B.	Blackburn
C.C.	Carnarvon
C.D.	Brighton
C.E.	Cambridge
C.F.	Suffolk, West
C.H.	Derby
C.I.	Queen's Co.
C.J.	Hereford
C.K.	Preston
C.L.	Norwich
C.M.	Birkenhead
C.N.	Gateshead
C.O.	Plymouth
C.P.	Halifax
C.R.	Southampton
C.T.	Kesteven, Lincs.
C.U.	South Shields
C.W.	Burnley
C.X.	Huddersfield
C.Y.	Swansea
D.	Kent
D.A.	Wolverh'pton
D.B.	Stockport
D.C.	Middlesbrough
D.E.	Pembroke
D.F.	Northampton†
D.H.	Walsall
D.I.	Roscommon
D.J.	St. Helens
D.K.	Rochdale
D.L.	Isle of Wight
D.M.	Flint
D.N.	York
D.O.	Holland, Linc.
D.P.	Reading
D.R.	Devonport
D.S.	Peebles
D.U.	Coventry
D.W.	Newport (Mon.)
D.X	Ipswich
D.Y.	Hastings
E.	Stafford
E.A.	West Brom'ich
E.B.	Isle of Ely
E.C.	Westmorland
D.E.	Warrington
E.E.	Grimsby
E.F.	Hartlepool
E.H.	Hanley
E.I.	Sligo
E.J.	Cardigan
E.K.	Wigan
E.L.	Bournemouth
E.M.	Bootle
E.N.	Bury
E.O.	Barrow-in-Furness
E.P.	Montgomery
E.S.	Perth
E.T.	Rotherham
E.U.	Brecknock
E.W.	Huntingdon
E.X.	Gt. Yarmouth
E.Y.	Anglesey
F.	Essex
F.A.	Burton-on-Trent
F.B.	Bath
F.C.	Oxford†
F.D.	Dudley
F.E.	Lincoln
F.F.	Merioneth
F.H.	Gloucester†
F.I.	Tipperary (N.R.)
F.J.	Exeter
F.K.	Worcester
F.L.	Peterborough
F.M.	Chester
F.N.	Canterbury
F.O.	Radnor
F.P.	Rutland
G.	Glasgow
H.	Middlesex
H.I.	Tipperary (S.R.)
H.S.	Renfrew
I.A.	Antrim
I.B.	Armagh
I.C.	Carlow
I.D.	Cavan
I.E.	Clair
I.F.	Cork*
I.H.	Donegal
I.J.	Down
I.K.	Dublin
I.L.	Fermanagh
I.M.	Galway
I.N.	Kerry
I.O.	Kildare
I.P.	Kilkenny
I.R.	King's County
I.T.	Leitrim
I.U.	Limerick*
I.W.	Londonderry*
I.X.	Longford
I.Y.	Louth
I.Z.	Mayo
J.	Durham
J.I.	Tyrone
J.S.	Ross and Cromarty
K.	Liverpool
K.I.	Waterford
K.S.	Roxburgh
L.	Glamorgan
L.I.	West Meath
L.S.	Selkirk
M.	Chester
M.I.	Wexford
M.S.	Stirling
N.	Manchester
N.I.	Wicklow
N.S.	Sutherland
O.	Birmingham
O.I.	Belfast
O.S.	Wigtown
P.	Surrey
P.I.	Cork†
P.S.	Shetland
R.	Derby
R.I.	Dublin
R.S.	Aberdeen‡
S.	Edinburgh
S.A.	Aberdeen*
S.B.	Argyll
S.D.	Ayr
S.E.	Banff
S.H.	Berwick
S.J.	Bute
S.K.	Caithness
S.L.	Clackmannan
S.M.	Dumfries
S.N.	Dumbarton
S.O.	Elgin
S.B.	Fife
S.K.	Forfar
S.S.	Haddington
S.T.	Inverness
S.U.	Kincardine
S.V.	Kinross
S.W.	Kircudbright
S.X.	Linlithgow
S.Y.	Midlothian
T.	Devon
T.I.	Limerick†
T.S.	Dundee
U.	Leeds
U.I.	Londonderry†
U.S.	Govan
V.	Lanark
V.S.	Greenock
W.	Sheffield
W.I.	Waterford
W.S.	Leith
X.	Northumberland
X.S.	Paisley
Y.	Somerset
Y.S.	Partick

* County Council. ‡ Town Council. † County Boro. Council.

NOTES —G., S., and V., either alone or combined with another letter, are reserved exclusively for Scottish registrations.

I. and Z., either alone or combined with another letter, are reserved exclusively for Irish registrations.

Ordinary identification marks are in white letters on a black ground. Manufacturers' marks consist of the local letters, and in addition their private mark and car number. These are of a different colour, usually red and white.

The police enjoyed the benefit of a straight hint from the chairman of the Kingston Bench in the case of a recent summons heard before them for exceeding the 20-mile limit. The usual question of the reliability of the stop-watch came up, and a special feature of the defence was that the measured distance asserted by the police to be 440 yards in length was, as a matter of fact, only 330. "Why don't the police," said the chairman, "take out these summonses for driving to the common danger?" He evidently felt that in that case there would be no need to bother about stop-watches or measured distances, that the mere statement of the intelligent police officer would suffice, and that the Bench would be able to convict with practically no trouble or bother even though in the case in question the Police-Inspector admitted no one was endangered. That conviction and not justice is the end aimed at could not be more clearly illustrated that by this ingenuous advice.

Mr. Claude Crompton, the elder son of Col. R. E. B. Crompton, C.B., both of whom are so well-known in the automobile world, was last week married to Jeanetta, daughter of General Sir Thomas E. Gordon, K.C.B.

Official police recognition is to be accorded, as asked, to the May Day parade of motor cars to be held on the 30th instant. As already announced, the procession will start at 3 p.m., the head of the assembling point being at the pedestal on the Thames Embankment, about fifty yards east of Charing Cross Bridge. The vehicles will commence by parading along the Embankment, and then travel up Victoria Street and Grosvenor Place, dispersing at Hyde Park Corner. About forty entries have so far been received, and as some substantial cash prizes are offered, and no entrance fees charged, a goodly number of owners, it is hoped, will allow their drivers to bring their vehicles to the parade.

AERONAUTICS.

M. ARCHDEACON has already commenced practical experiments with his aeroplane on the Merlimont sand-dune. Of course he has not yet accomplished very much, though short free flights have actually been effected. Most of the work has consisted in drilling the attendants into correctly starting the machine. This is by no means an easy feat. It takes four of them to hold it up, and when the instant comes for letting go, if they do not all instantaneously and at precisely the same moment release their grasp of the aeroplane, it receives, as can easily be imagined, a bias which very seriously interferes with a successful glide. The apparatus itself, too, seems according to the first experiments to be susceptible of some improvement in detail. The guide-ropes for operating the forward tail might, it is said, be advantageously replaced by a bar or rod, and the shoes with which the aeroplane is provided might well be made somewhat higher, so as to protect the tail and rudder more effectively when alighting. The first flights, which were carried out with Mons. M. Voissins, an aeronaut of Lyons, mounting the machine, did not exceed 25 metres. But even the little distance thus traversed made upon the spectators a powerful impression of what the machine will be capable of effecting when its manipulators have gone through their apprenticeship to its peculiarities. Capt. Ferber, who is an aeronaut of considerable experience, and has, it is understood, conducted successful gliding experiments of his own, though the results have not been generally published, is expected to arrive at Merlimont shortly, and will assist the experimenters with his experience and advice. It is anticipated that the experiments will then progress still more quickly

CAPT. FERBER himself is said to be the designer of a new aeroplane which has proved very successful in private trials. It is said to be built of bamboo, the surfaces being formed of fine canvas, and is fitted with a Buchet motor, which drives two silk-covered propellers, revolving in opposite directions, at 200 revs. per min. The whole machine, including the aeronaut, is said to weigh only 500 lbs. The power of the motor is stated to be 6-h.p. This, we think, has been under-estimated, as it hardly appears adequate for the work; at the same time, the weight has been almost certainly under-estimated. The best we can hope for is, that the machine should weigh 500 lbs. without the aeronaut. However, the aeroplane is evidently no mere plaything, as Capt. Ferber is credited with the intention to fly it across the Bay of Monaco at an early date.

INTEREST in the navigable balloon continues unabated in spite of the heavier-than-air experiments. Thus the veteran Count Zeppelin, whose experiments with a motor-driven cylindrical balloon on the Lake of Constance we chronicled some three years ago, is resuming his experiments with a somewhat smaller machine. He is being warmly supported by the King of Würtemberg and the Imperial War Office. Patriotic German manufacturers are supplying him with materials at cost price, or for nothing at all, while a public fund has been opened to defray his expenses, and has already reached upwards of £5,000.

M. SANTOS DUMONT, too, has returned to France, as we mentioned last week, and reports that his expedition to America was crowned with considerable success, as he succeeded in inducing the authorities of the St. Louis Exhibition to reduce the speed for the competing airships to 30 kiloms. per hour, and to make the distance to be traversed there and back 10 kiloms. From another source we are informed that M. Santos Dumont intends experimenting with airships for the purpose of ascertaining whether they can be used, as has been suggested, for discovering submarine boats when submerged, as it appears that though invisible to people close to the surface, submarines can be readily seen from a considerable height above it. When discovered, M. Dumont proposes, it is reported, to destroy the submarines with dynamite arrows, from which it may be legitimately inferred either that M. Dumont or his reporter rejoices in a picturesque imagination. Airships hurling dynamite arrows suggests "a vision of the future" with a vengeance.

DR. BARTON's great airship also is approaching completion at the Alexandra Palace, and it is anticipated that the first trial with it will be made very shortly. At any rate, according to a daily paper, Dr. Barton has already engaged the services of two black cats to confer luck on the experiments. There are people, however, who do not look upon black cats as exactly mascots. There are two creatures with which no sailor will willingly put to sea if he can help it, and one of them is a black cat.

MOTOR VOLUNTEER CORPS.

THE following gentlemen have been enrolled:—Mr. J. D. Crombie and Mr. P. W. Keily.

THE Corps had an exceptionally busy time during March, and it is gratifying to know that it has not been found wanting, and that all the duties undertaken were successfully carried out. The list, which will be of interest to note, included:—

A Staff Ride under Lieut.-General Sir John French, Commanding the 1st Army Corps, when some sixty officers were conveyed over the whole of the district of Chichester, from the 14th to 17th March. The following officers and members took part:—Lt.-Col. M. Mayhew, Capt. H. V. C. Ker-Seymer, Lieut. I. Ochs; Members O. Stanton, W. A. Ellington, P. V. Horgan, J. Rochford, H. Dixon, J. P. Dean, Earl Russell, W. Lewin, M. Carver, H. Hippesley, A. Millership, F. A. Rodewald, W. George, Rev. C. H. Craven, H. Titt, F. Haden-Morris, C. Swayne, and W. White.

At the conclusion of the tour General Sir John French expressed to the commanding officer his entire satisfaction with the arrangements which had been made.

A MOST interesting Staff Tour was carried out under Lieut.-General Lord Grenfell, Commanding the 4th Army Corps, on the 24th and 25th ultimo, when about eighty officers of the Scottish Volunteer Brigade were conducted around the London defences. On the first day the officers and members taking part reported themselves to Captain and Adjutant G. Skeffington Smyth, D.S.O., at Guildford Main Station at 9.30 a.m. Home was reached about 5.30 p.m. On the second day the parade was at St. James' Court, and from thence all cars proceeded to Purley Station, from whence the ride was continued through Caterham Valley, Winder's Hill, Titsey, to Otford and Farningham. From the latter place the order for home was given and London was reached about 6 p.m. Both days' work were very interesting to all members of the Corps, as giving them an insight into the manner in which London is protected from attack by land on its southern side, and showing how perfectly the great principle of reciprocal defence is carried out. Lord Grenfell has expressed his appreciation of the manner in which the duty was carried out by the Corps.

The following officers and members took part:—Captains W. J. Crampton, A. B. Hearn, H. V. C. Ker-Seymer, and E. Midgley; Lieutenants J. A. Holder, F. R. Bircham (24th only), J. F. Ochs, and P. W. Northey; Members C. Buttar, C. Braby, J. G. Bower (24th only), F. Strickland, F. Rochford, G. F. Herron, W. H. George, J. T. Overton, H. Brown, E. M. Collins, W. White, C. Swayne, A. S. May, H. Fear, C. Knight (25th only), Earl Russell, C. G. Davis, F. Windham, and H. S. H. Cavendish (24th only).

The following gentlemen very kindly placed themselves at the disposal of the Corps in connection with this duty:—Mr. Claude Johnson, Mr. E. K. Purchase, Captain Bowman-Manifold, R.E., and Captain A. Hill, M.P., 5th Royal Irish Rifles.

FROM the 17th to 22nd March, Members J. Whittaker and J. McKelvie were employed under General Sir Leslie Rundle, K.C.B., on a Staff Ride at York. This was the first occasion on which the Corps has been called upon for duty in the north of England, and it is gratifying to know that General Rundle has expressed his appreciation of the services rendered. From the 27th to 31st March, Captain J. F. Hammond and Member F. Lanchester were also employed under General Rundle at York.

THE undernamed members were engaged on a confidential Staff Tour in the vicinity of Warley on the 17th March:—F. S. Dyer-Bennet and G. S. Goodhart.

MR. H. S. H. CAVENDISH was on duty under Major-General Oliphant, Commanding Home District, on the 22nd, 28th, 29th, and 30th March.

A MOST interesting Staff Ride under Colonel Sir H. Rawlinson, C.B., was held in the neighbourhood of Newhaven and Brighton from the 28th to 30th March, when the following were on duty:—Major J. M. Benett-Stanford, Lieut. S. A. Holder, Members W. A. Ellington, E. Blount, C. Knight, and C. F. Herron.

MR. HARVEY DIXON was employed under Major-General Montgomery, Commanding Southern District, on a Staff Ride on the 22nd, 23rd, and 25th March.

DURING the Volunteer Cyclist Manœuvres held in the neighbourhood of Chester during Eastertide, from 1st to 4th April, Captain J. F. Hammond and Mr. T. W. Kemp were on duty with the Umpire Staff.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.

Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—Richmond Hill, the first stiff climb out of Douglas. The road to the left in the distance leads into Douglas.

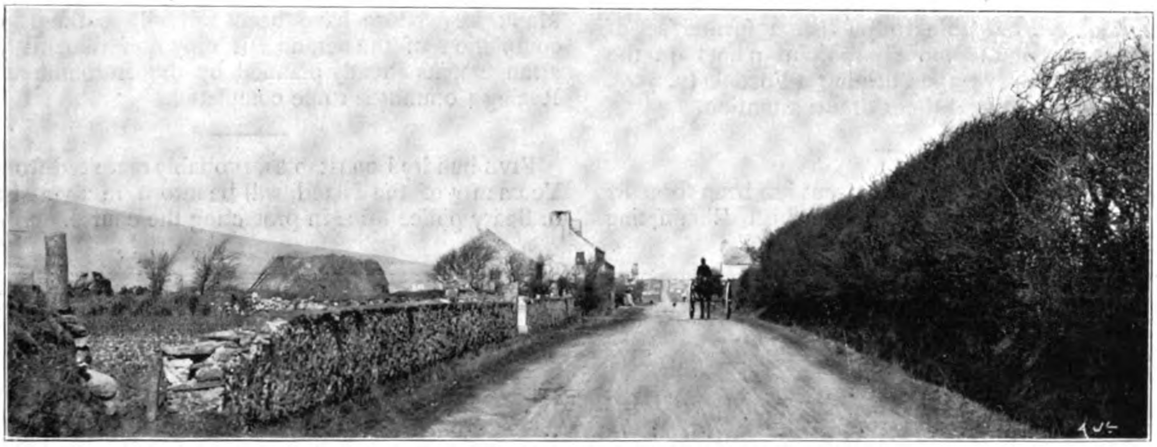


Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—A long straight rise from Silverburn to Foxdale.

Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—A further stretch of the Silverburn-Foxdale road.

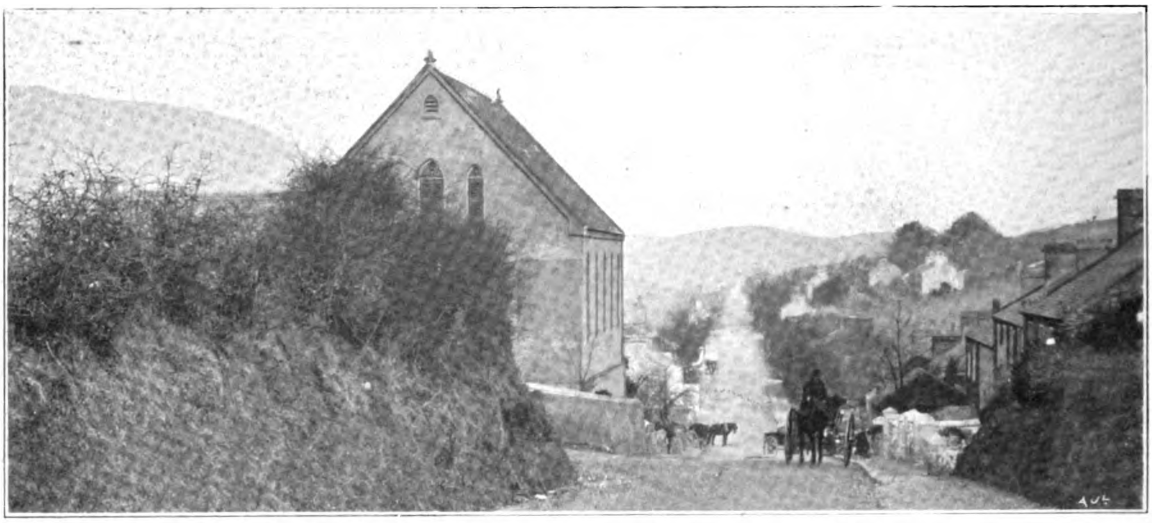


Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—The village of Lower Foxdale, reached almost immediately after the bad turn under the railway bridge.

GORDON-BENNETT ITEMS.

This week we are able to publish a further set of striking pictures of the more important points on the course, especially the very bad turning at Foxdale (p. 454), to which we have several times drawn attention.

As we anticipated, the Royal assent has been formally given to the Bill authorising the British Eliminating Trials to be held in the Isle of Man. The houses of the Manx Legislature have been formally notified of the completion of the act, and it only now remains for the arrangements already planned by the Automobile Club Racing Committee to be completed.

Five hundred constables, probably recruited from the Yeomanry of the Island, will be sworn in to assist the ordinary police force in protecting the course.

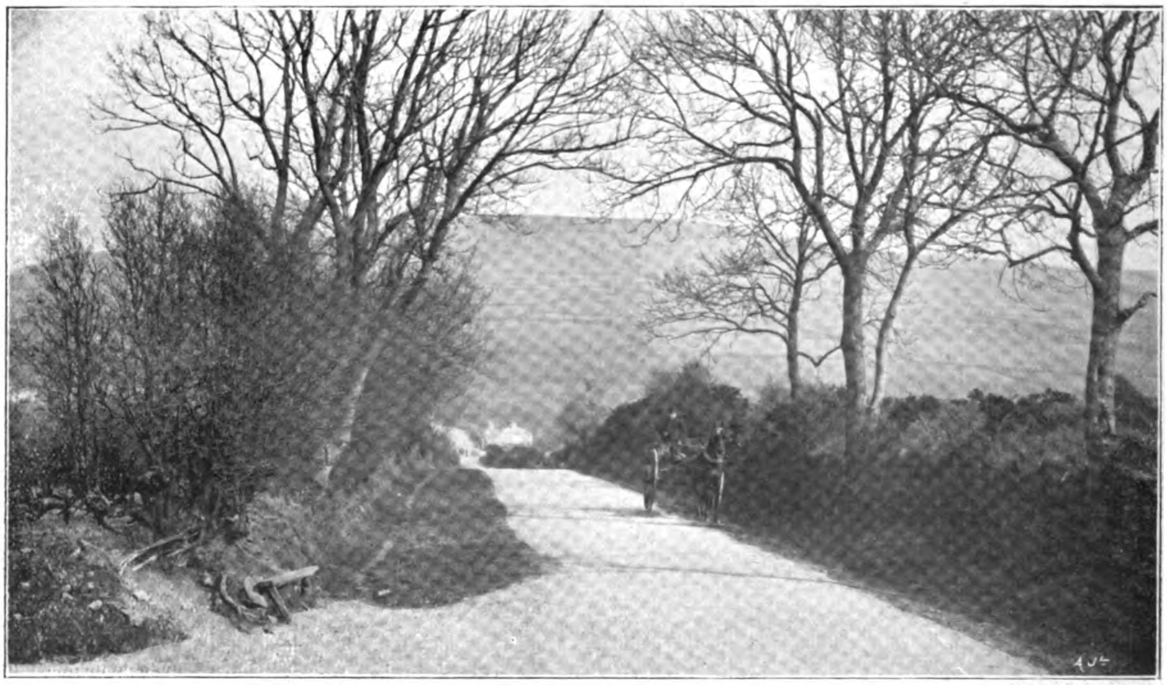


Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—A view near Ballacraine.

Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—The foot of Creg Willie's Hill. One of the stiffest climbs on the route, which in all probability none of the cars will be able to take on their top speed.

WE understand that the course, of which we have given a full description, starting from the Quarter Bridge, Douglas, will be strictly adhered to, and that in all probability about eight controls will be established, whilst the arrangements are well forward for carrying out the scheme for holding a three days' meeting, to include the Cup Trials. The other two days, as we announced a fortnight ago, will take the form of hill-climbing and speed trials on the splendid Douglas Promenade. On Saturday of this week the racing cars which have been entered to take part in the selection trials for Great Britain must be presented at the Automobile Club before 12 noon. The examination and the marking of parts, as we stated last week, will then take place in the Club's Motor House.

DRIVERS in the Eliminating Trials for the five Napier cars have been named as follows:—Lieut.-Col. Mark Mayhew, Mr. John Hargreaves, Mr. J. W. Stocks, Mr. Clifford Earpe, and Mr. S. F. Edge, and as a reserve, Mr. Cecil Edge. For the Wolseley cars, Mr. Charles Jarrott, Mr. Campbell Muir, and Mr. Sidney Girling are to drive. The drivers for the Darracq and Hutton cars have not yet been officially decided upon.

AFTER making all the necessary arrangements for selection trials for the cars which were to represent Germany in the race, the German Club will now probably be saved the expense and further trouble, as difficulty has arisen with the authorities in regard to holding the Eliminating Trials. The Benz car, it is reported, has been withdrawn, and, as two Mercedes cars have already been selected to represent Germany, it is only a matter of

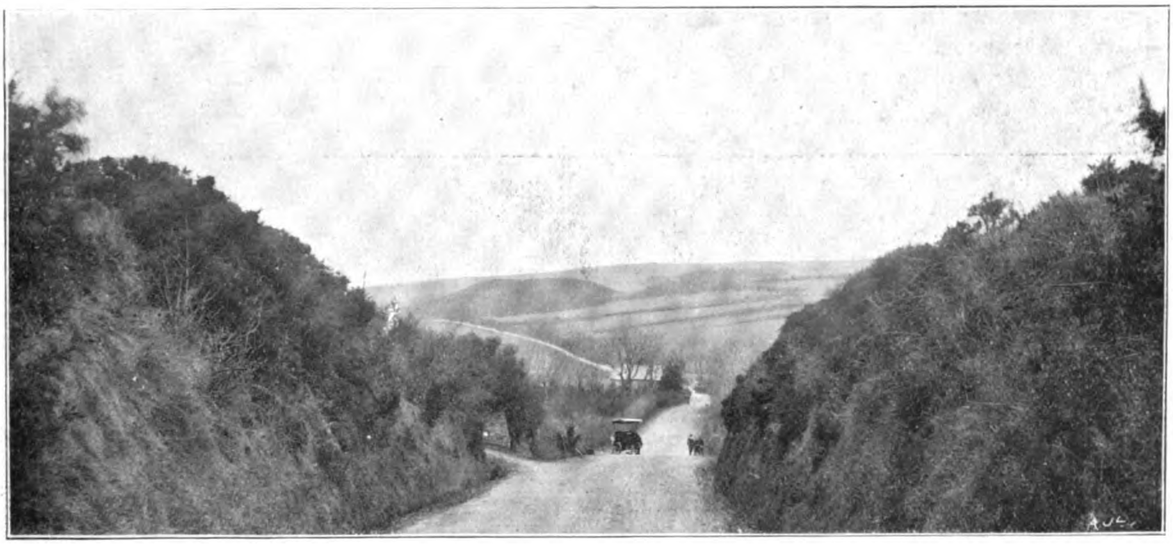


Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—Baregarrow Hill, near Kirk Michael.

Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—A long level road at Bishop's Court.

filling the third place, and in that case the choice for this will fall on the Opel-Darracq.

Alden Sampson has notified the A.C. of America that he will not be able to get the Sampson racing car finished in time for the Eliminating Tests at the end of the month. It is quite possible, therefore, failing the Hewitt machine being selected, that the American team will consist of three Peerless cars, for the construction of which that company are responsible. In the meantime the A.C.A. have extended the time for entries until May 1st, owing to Sampson's forfeit and Oldfield's recent suspension from racing.

It has been decided by the German Automobile Club to "authorise" an official guide in connection with the Gordon-Bennett Cup Race on the Taunus course. It will be placed under the editorship of Gustave Braunbeck, G.M.B.L., Munich. The complete official particulars are to be embodied in this work, and from experience of German publications of a similar nature, in all probability we may expect to find its usefulness largely nullified, and the work spoilt, by a perfect deluge of advertisements scattered throughout the pages. We only trust, for the sake of visitors, we may be wrong, and that the German Club may have specified that the book shall not be prostituted simply for the sake of obtaining a mass of advertisements.

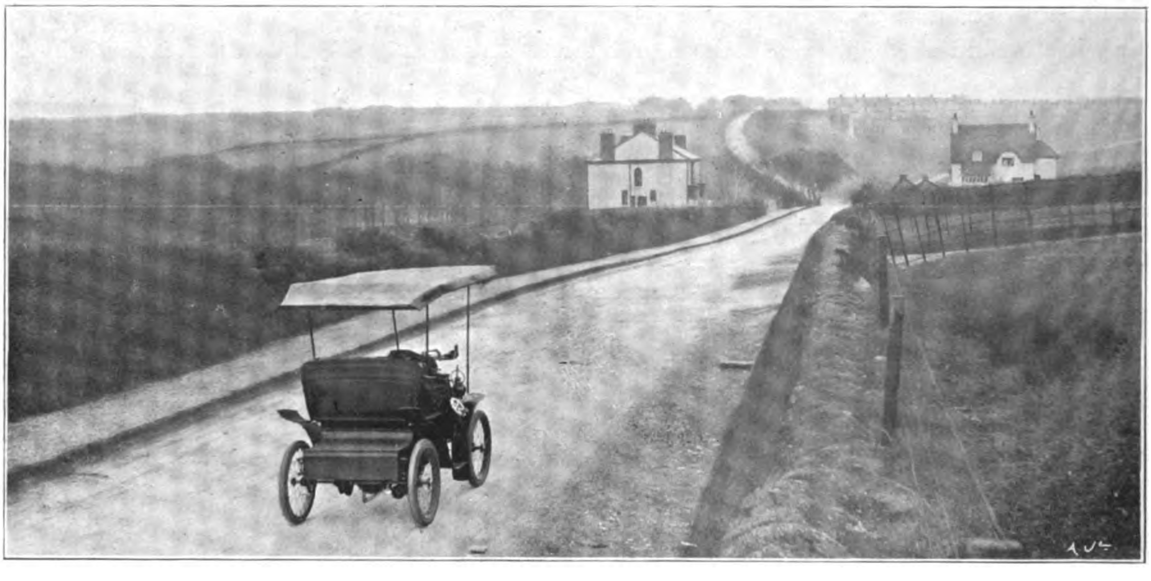


Photo by T. Keig, Douglas.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING COURSE.—Bray Hill, Douglas, down which the competing cars will travel at the finish of each circuit.

CLUB DOINGS.

Berkshire Automobile Club.—May 28th has been fixed for the opening meet, reception, and gymkhana of the club at Hall Place, Maidenhead, by invitation of the Chairman, Sir Gilbert A. Clayton-East, Bart. Meets have also been arranged for June 8th and 20th, July 13th and 30th, September 14th and 24th.

Derby Automobile Club.—Ashby-de-la-Zouch was selected for the second run of the year on Saturday last. The point for assembling chosen was the Nottingham Road, at the Chaddesden turning, from whence the route followed was by way of Sawley. The weather turned out extremely rough, the boisterous wind driving home some sharp hailstorms encountered on the way. Following last year's custom, the Derby Club arranged to meet the Nottingham Club at the venue selected, and an agreeable surprise was in store upon finding that in addition members of the Leicester Automobile Club had also fixed upon the same day and the same place for their first outing. The accommodation of the Royal Hotel was strained to the utmost, the cars altogether numbering close upon 50. The visitors made an imposing show of over 100. This large influx of cars, at so early a time in the year, created quite a sensation in the little town, and an effort is to be made to arrange another fixture under similar conditions next season. The next run is fixed for the 27th instant, when a visit is to be made to the Stanton Ironworks and Hall, by the invitation of Mr. Crompton, and on May 14th a Hill-Climbing Competition is an interesting fixture being looked forward to with considerable pleasure by the members. A number of other fixtures have been duly arranged up to as late as October 8th, and under the energetic Hon. Secretaryship of Mr. Chas. J. Allin, a busy season appears to be in store for the members of the Club.

Lincolnshire Automobile Club.—The members of this club opened their season on Saturday, the 9th instant, with a meet at Spilsby. Although the weather was delightfully fine and the roads in splendid condition, there was not such a large turn-out as was expected—there being less than twenty cars and motor-cycles altogether. Some, however, came long distances—Mr. G. Linnell and party from Market Deeping undertaking the journey (between 50 and 60 miles) on a finely-equipped 10-h.p. Wolseley. Several cars were present from Lincoln (about 30 miles), including Captain Newsum (who was accompanied by Mr. J. R. Richardson) and Mr. C. W. Pennell, both driving 12-h.p. Richardson cars, Mr. W. R. Pennell on his 10-h.p. Locomobile, Mr. C. Nelson on a De Dion, Mr. Godfrey Lowe, and G. W. Wilkinson. Others present were Capt. J. A. Cole, J.P. (Roxholme Hall), on his powerful Durkopp; Mr. W. A. Tomlinson (Sleaford), on a Barden; Mr. George Godson (Sigarby Hall), on a Daimler; Mr. C. Holland (Boston), and Dr. Reckitt (Boston), each on a Baby Peugeot; Mr. W. B. Jevons (Market Rasen), on an 8-h.p. De Dion; Mr. Parsons-Wright (Wold Newton), on an 8-h.p. M.M.C.; Dr. E. Cragg, Hon. Sec. (Billingborough), on an Enfield Quad, and the Rev. R. H. Simpson (East Keal) and Dr. White (Swineshead), each on a motor cycle. The party made "The Shades" their headquarters, and soon after their arrival they partook of a refreshing tea. A committee meeting was subsequently held, and it was decided to join the Buxton run on June 11th, and also to try to arrange a meet with the Sheffield A.C. at Bawtry, on July 2nd. The following new members were elected:—The Rev. T. A. Stoodley (Dowsby, near Bourne) and Mr. C. Algernon Moreing, the new Conservative candidate for the Gainsborough division, who will reside at Riseholme Hall, Lincoln. The club has now a membership of about 130. The annual dinner, which is fixed to take place at Lincoln to-day (Saturday), promises to be a most successful affair. Sir Hickman Bacon, Bart. (the president of the club), Lord Willoughby de Eresby, M.P., Mr. C. H. Seely, M.P., the Hon. J. Scott Montagu, M.P., the Mayor of Lincoln, and Lieut.-Col. Mark Mayhew (Commanding Motor Volunteer Corps), have promised to attend. The next meet of the club will be at Grantham (headquarters, the George Hotel), on April 21st.

Scottish Automobile Club.—The annual general meeting of this club was held last Tuesday in the Central Station Hotel, Glasgow, Sir J. H. A. Macdonald, K.C.B., the president of the club, presiding. The business to be transacted was of a somewhat formal character, and the attendance was consequently small. The report, which had been circulated among the members, and was taken as read, went to show that the club is in a flourishing condition numerically and financially. The membership is about 350, while the combined balances of the sections amounted on January 31st to about £300.

In proposing the adoption of the report the Chairman referred to its satisfactory character, and suggested, in connection with the small attendance, that his experience went to prove that, when things were going in a way to please everyone, meetings such as that in which they were engaged were poorly attended. It was only when discontent was prevalent, or some other active cause existed, that full meetings need be expected He then referred at some length to the advantages resulting from the new Act, and made fun out of the pessimists who, when it passed, maintained that it sealed the fate of the automobile industry and automobilism in the United Kingdom. The prospects of the movement were brightening daily, railway companies were beginning and would rapidly increase to use motor cars as feeders, towns were beginning to use them for street use, and he believed that in a few years—three or four years—the public would awake to the superiority of motor cars over tramways for road conveyance. Other points referred to were the improvement of roads and the suppression of dust, the coming of the commercial motor car as used both by business houses and railways, and the use of motors in agriculture.

The remaining business consisted of the election of president, to which position the chairman was re-elected, and the election of ten representatives of the General Council. These were Messrs. Brook, Crosby, Irons, Macdonald (Norman), Nisbet, Paterson, Prosser, Ross, Sleigh, and Weir.

The usual formal votes of thanks concluded the proceedings.

RACES, RECORDS, AND TRIALS.

Official Long Distance Non-stop Runs.—The Automobile Club having undertaken to vouch for long distance non-stop runs on the road, the club have thought it best to make the conditions under which these runs can be vouched for perfectly clear to manufacturers. The following are the points to be observed:—

The first consideration is that the run shall be an absolute non-stop run of the motor and the car, no stops of any nature whatever being admitted except for traffic purposes, when the motor may be stopped if the driver is called upon to do so, so that any stop, whether for tyres or other purposes, will be considered as the end of the run.

Every run must start from the Automobile Club or from the club house of an affiliated club, and indication of the intended length of the run and the route to be covered is to be given to the technical secretary of the Automobile Club at least a week before the date of the run.

Accumulators or other parts may be changed, and fresh petrol may be picked up and put in the tanks so long as neither the car nor the motor is stopped for the purpose.

A fee of 1 guinea for every 100 miles of the declared run will be charged, with a minimum of 5 guineas, for the purpose of the payment of the observer. An additional 3 guineas as a club fee will be charged for 500 miles or under, 5 guineas for 500 to 1,000 miles, and 8 guineas for over 1,000 miles.

Automobile Club Side-slip Competition.—A second official list has been published of the entries in this contest. On March 5th we published the first list of entries. In the one now issued a new name appears, viz., the Civil Service Cycle Agency, Limited, and L'Empereur is substituted for the name of Henri David. The following names which were in the first list are no longer included in the list of competitors:—Continental C. and G. P. Company, Wm. Cross and Sir Chas. Ross, Taylor Stevens, E. Midgley, W. H. Manning, and J. Harrington. The club, we are advised by Mr. A. E. Perman, have selected the Locomobile Garage, Sussex Place, South Kensington, as their headquarters for these trials, commencing on the 18th inst. and extending until May 7th. During the whole of this time the cars will each evening be kept at this garage, which has been selected owing to the special facilities which can be given to ensure all the cars and cycles being placed under lock and key every night. A separate entrance to the usual garage entrance will be provided, so that the competition will not in any way interfere with the regular Locomobile Garage business. The Company are arranging to have special supplies of petrol on hand for the competitors, as well as oil, grease, accumulators, spare parts, and anything else they may require.

The Palmer Tyre Company have offered the full use of their resiliency testing apparatus at Silvertown for the purposes of the Side-Slip Trials.

The routes selected for the Side-Slip Trials are to Nottingham and Birmingham on Thursday, Friday and Saturday; on Monday, to Slough, Beaconsfield and back, twice round, giving a considerable amount of tramlines: the other routes being to Marlborough and back, Canterbury and back, and Northampton and back, the full distance being about 850 miles. May 7th is the date for the actual "slipping" trials, before which the resiliency and absorption of power tests will take place.

The motor cycles will only be subjected to four days' endurance test.

Van Trials.—It has been decided that this trial, which was proposed to be held in October and November next, shall be postponed to commence on February 1st, 1905. As it has been considered impracticable to arrive at a fair basis for all the vehicles, upon which the awards could be made owing to the varying loads, distances, and state of the weather, to which the competing vehicles would be subjected under the ordinary every-day employment by different firms, it has been decided that the trial shall consist of daily runs from Sittingbourne to London, with a load of paper, returning light the next day. The trial to extend over two months, the daily distance to be 40 miles, to be covered six days a week. The entrance fee is £20 per vehicle for all classes.

100 MILES TRIAL CERTIFICATES.

A SPECIAL 100 Miles Non-Stop Trial of the A.C.G.B.I. was held on March 14th for five vehicles entered by Messrs Humber (Limited), Coventry. The official report is now issued. The route was the usual one, from the Club House towards Oxford, immediately beyond the 49th milestone and back. The road was good, weather fine, the wind fresh—on outward journey against the cars, on return journey with them.

The hills on which hill-climbing trials took place were:—

(*a*) The steep portion of Dashwood Hill, commencing at 33rd milestone and ending at danger-board at the top, 1,180 yards, having an average ascent of 1 in 16, and including 352 yards of 1 in 10·9.

(*b*) One mile, including Dashwood Hill, commencing at 33rd milestone, and terminating at 34th milestone, having a total rise of 241 ft. in 1 mile, including 275 yards of a gradient of 1 in 21·7 and 600 yards of a gradient of 1 in 11.

(*c*) Aston Hill on the return journey. Distance 1 mile 1,100 yards, having a total rise of 385 ft., and including 1,910 yards of a gradient of 1 in 21.

3½-h.p. **Olympia Tandem.** Single cylinder, water cooled by thermo syphon system. High tension electric ignition. Chain transmission. Weight without passengers 4 cwt. 1 qr. With passengers 7 cwt. 0 qrs. 19 lbs. Spirit used 2 gals. 1 qt. 16 ozs. Water 2 gals. 2 qts. Average cost of fuel per mile, at 1*s.* 3*d.* per gallon, ·35*d.* Speed outward journey 16·26 m.p.h., return 19·8 m.p.h. Hill climbing speed with 2 passengers up (*a*) 3 mins. = 13·4 m.p.h.; (*b*) not recorded; (*c*) 3 mins. = 10·83 m.p.h. Stopped for 6 minutes to fix petrol tank.

6-h.p. 2-seated **Royal Humberette.** Single cylinder, water cooled, high tension electric ignition, transmission direct drive on top speed by a flexible shaft to main axle. Weight without passengers 9 cwt. 0 qrs. 7 lbs. With 2 passengers 11 cwt. 2 qrs. 15 lbs. Spirit used 3 gals. 1 pt. 14 ozs. Water 1 qt. Cost of fuel per mile ·48*d.* Speed outward 17·64 m.p.h., return 17·85 m.p.h. Hill-climbing speeds with 2 passengers up (*a*) 3 mins. 42 secs. = 10·87 m.p.h.; (*b*) 4 mins. 18 secs. = 13·95 m.p.h.; (*c*) 2 mins. 31⅜ secs. = 12·95 m.p.h.

8½-h.p. 4-seated **Humber.**—2 cylinders, water-cooled, electric ignition, coil and accumulators, transmission through gear and universal joints to live-back-axle. Weight without passengers, 13 cwt. 2 qrs. 1 lb.; with 2 passengers, 19 cwt. 2 qrs. 11 lbs. Spirit used, 4 gals. 2 qts. Water, no record owing to leakage. Fuel cost per mile, ·67*d.* Speed outward, 14·9 m.p.h.; return, 17·34 m.p.h. Hill-climbing speeds with 4 passengers up (*a*) 3 mins. 40 secs. = 10·97 m.p.h.; (*b*) 5 mins. = 12 m.p.h.; (*c*) 9 mins. 34 secs. = 10·19 m.p.h. Stopped 45 mins. for puncture, stopped twice for water through leakage. Radiator leaking before run commenced.

14-h.p. 4-seated **Humber.**—4 cylinders, water cooled, electric ignition, coil and accumulators. Transmission through gear and universal joints to live-back-axle. Weight without passengers, 23 cwt. 1 qr. 23 lbs.; with 2 passengers, 29 cwt. 0 qr. 11 lbs. Spirit used, 5 gals. 10 ozs. Water, 1 qt. 1 pt. Fuel cost per mile, ·75*d.* Speed outward, 20 m.p.h.; return, 18·92 m.p.h. Hill-climbing speeds with 4 passengers up (*a*) 3 mins. 22 secs. = 11·94 m.p.h.; (*b*) 4 mins. 14 secs. = 14·17 m.p.h.; (*c*) 6 mins. 19 secs. = 15·43 m.p.h. Stopped 14 mins. for puncture.

25-h.p. 4-seated **Humber.**—Weight with passengers, 28 cwt. 3 qrs. 18 lbs. With 2 passengers, 36 cwt. 0 qr. 26 lbs. Abandoned run 1¼ miles from Beaconsfield owing to sparking plug being blown out of socket.

THE first half of the endurance test for the anti-skid devices terminated successfully at Nice last week, when the six competitors all arrived in good condition. These included Samson I. (fitted on a 24-h.p. De Dietrich, three passengers), Samson II. (12-h.p. Panhard, two passengers), Samson III. (20-h.p. Chenard-Walcker, four passengers), Billet (20-h.p. Prunel, four passengers), Herault (14-h.p. Renault, four passengers), Fouillby (16-h.p. Mors, three passengers). The start home again to Paris was made on the 8th inst., the cars being due at the A.C. de France Club House on Tuesday last at noon, when all the devices were duly photographed under the rules prior to the issue of the report.

A CERTAIN amount of misunderstanding having arisen in regard to the competitions arranged by the A.C. de France, which take place in August next, it has been officially notified that the trials will comprise (1) a test for industrial vehicles, sub-divided into classes for express vehicles, and for commercial vans; (2) a test for electric passenger vehicles; (3) a test for speed and distance recording devices which will be fitted on the cars of the members of the jury; (4) an endurance test for protecting devices for pneumatics.

THE Tourist Trial for light cars, which it was proposed to hold in connection with the Arras Exhibition, has been abandoned, and in the place of this "Tour du Pas-de-Calais" three events are announced for May, viz., a hill climb, a speed kilometre, and a 5 kilometre race.

IN our last issue we stated that there was a very good chance of Barney Oldfield being suspended by the Racing Board of the American Automobile Association. By cable from America it is reported that this has now taken place, and Haussmann, another crack driver, has shared the same fate. If the decision is adhered to both men will probably take to motor boat racing. Following the suspension Winton has appointed Harry Owesney, of Washington, to drive his racers.

THE postponement of events on the Continent is fashionable. The latest concerns the Vienna Alcohol Exhibition, which, it is now announced, will not be opened until the 21st inst.

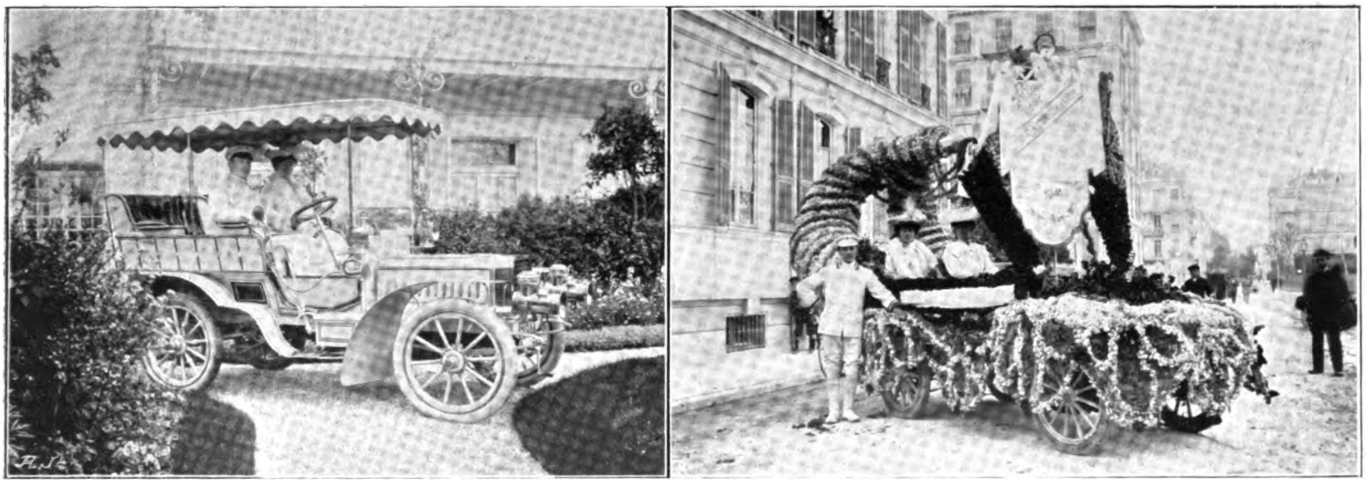
IN the Paris-Bordeaux-Paris Endurance Trial for motor cyclists, organised by the Auto Cycle Club of France, it has been decided to start the contestants at minute intervals, two at a time.

A CUP of the value of £200 has been offered by the Italian sporting journal, *Verde e Azzurro*, for a motor bicycle event during the coming season. It will probably be allotted to the Milan-Venice contest in July.

Dr. Boverton Redwood has been elected vice-chairman of the A.C.G.B.I., and amongst additions to the Industrial Committee of the club are Mr. E. M. C. Instone, of the Daimler Motor Company, and Mr. C. Harrington Moore.

An important announcement was made by Mr. Arnold F. Hills, on Monday, when presiding at the General Meeting of the Thames Ironworks Shipbuilding and Engineering Company, Limited. In speaking of the work to be undertaken by the Company for the present year, he stated that the directors were completing a design for a tractor for omnibus purposes, and arranging for the making of steam lurries, for which the demand was now greatly increasing.

When the decisions are announced in connection with the applications for limiting the speed in certain boroughs, we have every hope they will be very disappointing to the local councils who have so unnecessarily endeavoured to carry their narrow minded ideas into effect. To the majority of the councils throughout Great Britain, the hint, given by the L.G.B. in the circular accompanying the full regulations, proved sufficient to ensure wiser counsels being there and then adopted, but evidently even a stronger hint should have been given judging by the results in certain other districts. Though consenting to hold inquiries at Winchester and Dover (to which we refer editorially) they do not view the tactics of the reactionary bodies with much favour. The views prevailing at the L.G.B. may be gathered from a communication which they have addressed to the Holland County Council, in connection with an application for closing three roads against motor car traffic at night time, one being on the main road from Spalding to Crowland. The Board, before taking any steps in the matter, asked to be furnished with the grounds of the application. They were not prepared to say that the restrictions under the Motor Car Act could not be legally confined to night time, but up to the present they had not received any application for partial prohibition of this kind, and the applications for the special treatment of particular roads were very rare. Therefore, it must be understood that specific evidence of the unsuitability of the roads for motor traffic would be required, and it was only in exceptional cases that the Board would sanction the entire closing of a road against motor traffic during a particular period. Further, there might be some practical difficulty in indicating to motorists at night the limits of prohibited highways. Even in the face of this further strong hint, the local council has determined to still endeavour to get the restrictions imposed.



THE MONTE CARLO "CORSO FLEURI" AND "CONCOURS D'ELÉGANCE."—Last week we gave a photograph of the Winning Car, at the Corso Fleuri, which was exquisitely decorated to represent l'Entente Cordiale. We are now able to give a further photograph of this car—a different view—showing the magnificent Banner which it secured. She was awarded also an objet d'art on the next day, undecorated, in the Concours d'Elégance. The Car is a 12-h.p. Gladiator, and is owned by Mr. Walter Munroe, of Brockenhurst, Hampshire, a well-known English automobilist. The Car without its Floral Decorations is seen in our left hand picture.

In cases where the local authority remains obstinate (we would prefer to say recalcitrant), the L.G.B. appear to have decided on the following course. Where objections are offered to the introduction of the limit by members of the public, the Board refuses to make any such regulation without either first receiving observations of the Council in writing in reply to the objections urged, *or* holding a local inquiry. This, at any rate, is the course they have adopted in regard to the demand for the 10-mile limit by the Leigh Town Council, and have asked the Council whether under the circumstances it would prefer an inquiry or would offer its observations in writing. The Town Clerk has been instructed by his Council to take the latter course, an indication, it may be presumed, that the two inquiries that have been held are not looked upon in municipal circles as being very favourable to the sacred cause of the 10 miles an hour restriction.

Beyond the Tweed the same enlightened views are held by the Right Hon. Graham Murray, the Secretary for Scotland, who wields the same powers there as the L.G.B. in England. He has, metaphorically speaking, sat down very hard indeed on the Stirlingshire County Council in regard to an application in connection with certain restrictions and prohibitions in their district. In advising that council not to proceed with their proposed application, he pointed out that the mere possibility of danger was not enough in itself to justify the proposed restrictions, unless proof could be given that *real danger* existed, even to an efficient driver.

Mr. W. D. G. Goff, the chairman of the Irish Automobile Club, has secured from Mr. E. H. Lancaster, a 20-h.p., 1904 model, Clément car.

The Duke of Bedford, K.G., has selected, for the coming season, a shooting brake, giving 25-h.p., and manufactured by the Motor Manufacturing Company, Limited.

In the past, the Liverpool Motor and Cycle Shows have been so well patronised that the directors have found it difficult to allot the full amount of space required to all applicants. They have, therefore, for their next Annual Show, to be held in March, 1905, secured one of the large markets with immense yards for the trials of motors. The Exhibition will again be under the auspices of the Liverpool Self-Propelled Traffic Association, and trials for various medals will be held, and Sir Alfred L. Jones's Challenge Cups for 100 guineas and 20 guineas will again be open for competition.

DOINGS OF PUBLIC COMPANIES.

Car and General Insurance Corporation, Limited.—The statutory meeting of shareholders of this company was held last week, Mr. Edward Manville, the chairman, presiding. He stated that the subscribed capital now stood at £50,000, an amount entirely adequate for the business of the company at the moment. The new business completed for the four weeks prior to the meeting had averaged £500 per week, and during the last two months the income had not only exceeded the actual expenditure, but the proportionate estimated expenses for the year. They might, therefore, consider themselves fairly launched and entirely independent of their capital. They had now about 500 good agents in the United Kingdom. In the future they hoped to do a considerable business in connection with the Workmen's Compensation Act. The present time was an exceptional opportunity to take this business up, the rates being on an average 33 per cent. higher than they were in 1900 and 1901. These rates, by experience, were found to be ample.

The chairman spoke in the highest terms of the manager and secretary, Mr. Frederick Thoresby, to whom he said the shareholders were greatly indebted, as he had worked with the greatest energy and ability in the interests of the Corporation.

A cordial vote of thanks to Mr. Manville for presiding terminated the proceedings.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Automobile Engineering Company (Limited), 34, Leadenhall Street, E.C.—Capital, £15,000 in £1 shares (7,500 preference). Object, to adopt an agreement with Corders' Trust, Limited, and to carry on the business of manufacturers of and dealers in motor cars, motors and their accessories, &c.

Auto-Van Supply Association (Limited).—Capital, £5,000 in £1 shares. Object, to buy and sell self-propelled vehicles of all kinds, &c.

Britannia Electric Carriage Syndicate (Limited).—Capital, £12,000 in £1 shares. Object, to adopt an agreement between L. Garcin and A. Renault of the one part and F. G. Holland of the other part, for the acquisition of patent No. 23,426 of 1902, to manufacture and deal in carriages, to carry on the business of electricians, mechanical engineers, &c.

Motor and General Tyre Company (Limited).—Capital, £1,000 in 900 ordinary shares of £1 each and 1,000 founders' shares of 2*s.* each. First directors: M. Guthrie, W. Turner, and E. H. Nelson.

Traction and Power Agency (Limited), 92, Victoria Street, S.W.—Capital, £500 in £1 shares. Object, to carry on the business of omnibus, carriage, and boat builders, carriers, cycle and motor manufacturers, &c.

Velox Motor Manufacturing Company (Limited).—Capital, £2,000 in 10*s.* shares (2,000 deferred). Object, to adopt an agreement with the London Pioneer Syndicate (Limited), to manufacture and deal in motors, cycles, &c. First directors, H. A. Clifton, F. Richards, and T. S. Rea.

LAW REPORTS.

Bryan, Donkin and Clench (Limited).—In the Chancery Division on Tuesday, Mr. Justice Joyce heard a motion in the action of Shipley *v.* Bryan, Donkin and Clench (Limited), by which the plaintiff asked for the appointment of a receiver and manager of the company. Mr. Hamilton, K.C., stated that the defendants carried on business as general and electrical engineers and manufacturers of motor cars. They had issued £100,000 of debentures, and the plaintiff held £10,000 "A" and £5,500 "B" debenture stock, and the interest was in arrear. It was extremely important that valuable contracts should be carried out, and that the business should be sold as a going concern.

Mr. Justice Joyce appointed a receiver and manager to act at once.

Trade Identification Marks.—Mr. Lane, the presiding magistrate at the West London Police Court, gave his decision on Tuesday in the case of the Garage Company, Limited, of Queen Street, E.C., who were charged with "fraudulently allowing an unregistered motor car to be used."

A motor car, numbered "A I G H," and driven by Mr. C. V. Moore, of Matheson Road, Fulham, was stopped by a constable, who noticed that the letters were not properly fixed. Inquiry showed that though the car was the property of Mr. George Edwardes it bore the identification mark of the defendant company, to whose garage it had been sent for repairs, and it was not registered. Mr. Moore, who was subsequently summoned for "using an unregistered car," pleaded that the company lent him their identification mark for the purpose of his trying the car to see if the repairs were sound, Mr. Edwardes, who was a friend of his, having asked him to do so. The magistrate imposed on Mr. Moore a penalty of £3. The point now at issue was whether the company had acted "fraudulently" in so lending their identification mark.

Mr. Lane, K.C., said he was satisfied that whoever allowed the Company's marks to be attached to the car believed that a car taken out on trial for the purpose of testing the repairs was in the same category as one being tested by an "intending purchaser," or a new car being tested for its running qualities "after completion" by the manufacturer. It should, however, be clearly understood by owners and manufacturers of motor cars that the words "intending purchaser" meant exactly what they said, and could not be extended to cases of cars on repair. There was no "fraudulent permitting," and he therefore dismissed the summons.

Mr. Wontner, who supported the summons, expressed the hope that his worship's decision would not encourage others to set up a similar defence.

Mr. Lane: Of course, if a similar defence is set up in future cases I shall not accept it in a confiding spirit.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1902.

Published April 21st, 1904.

28,514. C. Jenatzy. Tyres.

Applied for in 1903.

Published April 14th, 1904.

6,365. Soc. Anon. Panhard and Levassor. Exhaust boxes or silencers.
6,853. E. Draullette. Electric road carriages.
8,126. R. Lindsay. Friction clutches.
9,963. C. H. Collins and W. O. Smith. Speed indicators and recorders.
10,004. E. Heber. Treatment of benzine or benzine or petroleum spirit for the purpose of removing their disagreeable odour.
10,525. A. Koechlein. Speed-changing and reversing gear.
10,608. G. P. Mills and Raleigh Cycle Company (Limited). Motor bicycles.
12,426. Clayton and Shuttleworth (Limited). Speed - changi mechanism.
12,886. F. Reichenbach. Flywheels.
16,623. J. Ridley and others. Gearing.

Published April 21st, 1904.

7,064. F. W. Lanchester. Electrical connections.
7,527. B. Musgrave. Internal combustion engines,
7,620. G. J. and E. C. Ihrig. Exhaust silencer.
7,747. P. C. Noble. Internal combustion engines.
11,422. S. Knight and A. Campbell. Variable speed or feed gear.
11,719. E. Roux. Motor wheels.
11,723. A. Soames and W. Langdon-Davies. Clutches.
11,849. E. A. Beard. Vapourising and carburetting apparatus.
12,043. G Litton and S. J. Carpenter. Variable speed-gear
27,209. J. Wyss. Means for controlling motor speed.
28,273. H. J. E. Hennebutte. Carburettors.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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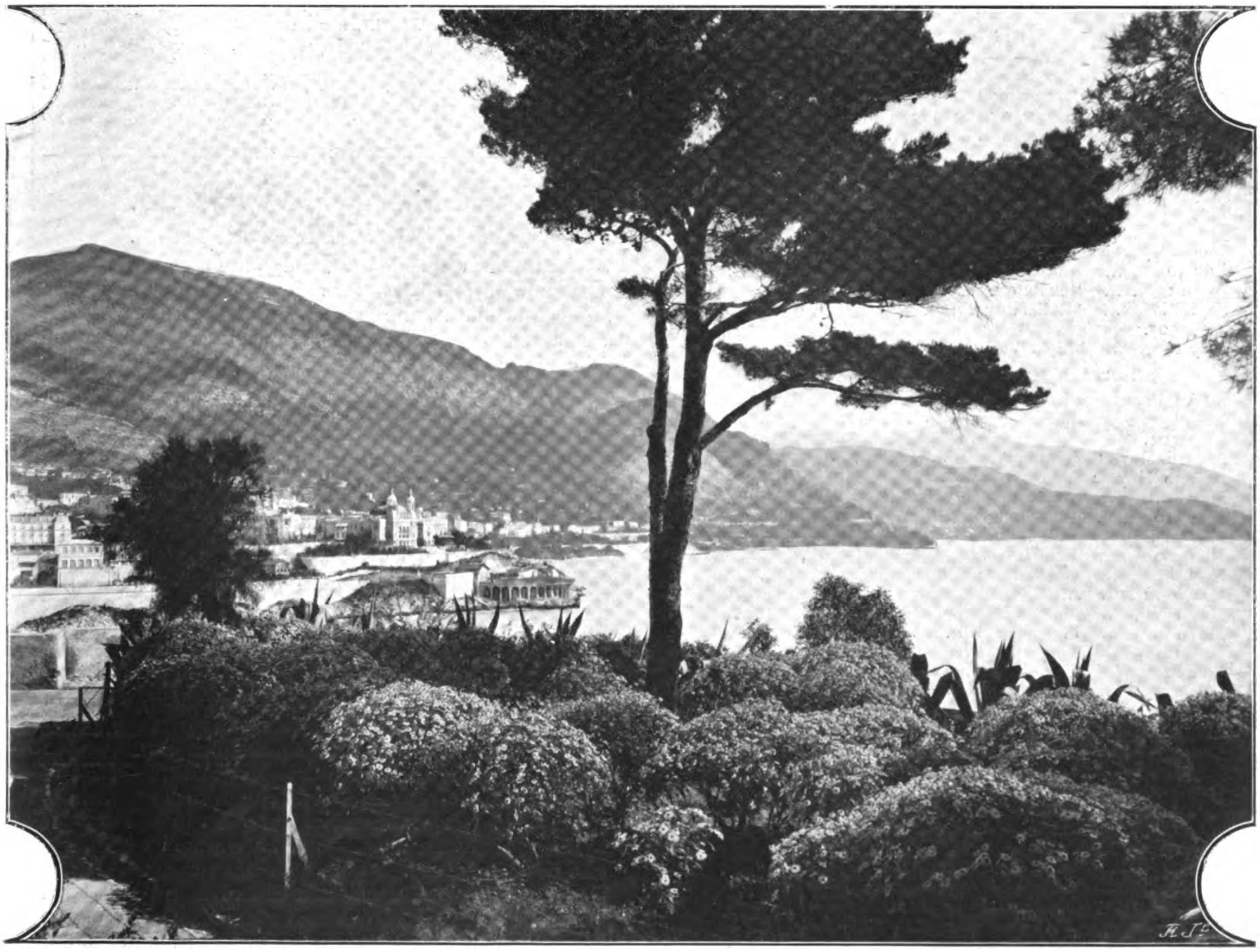

MONACO BOAT MEETING.—A view of Monte Carlo, showing Le Tir aux Pigeons, near which the Motor Boat Race for the Prince of Monaco's Cup and the other Speed Races were run off last week.

THE AUTOMOTOR JOURNAL.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
April 30 ...	May Day Parade (Thames Embankment, 3 p.m.).
May 7 ...	*Side-Slip Trials.
May 7 ...	*Quarterly 100 miles Trial.
May 10 ...	British Gordon-Bennett Race Eliminating Trials.
May 14 ...	Auto Cycle Club Hill Climb.
May 14 ...	Nottinghamshire Club Hill Climb.
May 19–20 ...	Glasgow-London Non-Stop Run.
May 28 ...	Auto Cycle Club Combined Run to Yarmouth.
June 11 ...	Automobile Races, Ranelagh Club.
June 27–July 2	Motor Bicycle Endurance Trial.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
1905.	
May 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Apl. 16–May 31	Vienna Auto Show.
Apl. 30–May 12	Antwerp Salon.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May 16 ...	Carburettor Trials (A. C. de France).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8–12 ...	A.C. Bordelais Automobile Week.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 27 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 15–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 23–Aug. 5	Spa Automobile Fêtes.
Aug. 5–11 ..	Paris–Deauville Motor Boat Race.
Aug. 12 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

Double-Decked Main Streets for London.

By far the most imaginative, and, quite possibly, also the most practical proposal for relieving congested London traffic, and putting the locomotion of the Metropolis on a common sense basis, is the double-decked main avenue scheme of Messrs. C. S. Meik and Walter Beer, described by them in evidence before the Royal Commission on London Traffic last month. Messrs. Meik and Beer have now issued an illustrated description of their scheme, introduced by an extremely succinct and lucid explanation, and followed by a map and sumptuous plates depicting imaginary avenues arranged in accordance with their suggestions. It is proposed to commence with the construction of four avenues, roughly at right angles to one another, meeting somewhere near Mount Pleasant, and extending from that centre to near Enfield in the north, to Purley in the south, to Barking in the east, to Osterley Park in the west. For some four or five miles from the centre of the town the avenues are to be double-decked, and for the rest of their length, *i.e.*, for the more countrified portions, to be single-decked. It is on the double-decked portions of the avenues that the imaginative originality of Messrs. Meik and Beer's scheme is most clearly displayed. The centre of the proposed roadway, 160 feet in width, is to be occupied by the standards of an elevated suspension electric railway, of the type that has proved conspicuously successful at Barmen and Elberfeld, in Westphalia. There is a space of 26 feet under the standards of the elevated railway, and this is to be dedicated to motor car traffic. On either side of this are to be footpaths, then on each side an ordinary electric tramline, outside that, on either side, the roadway for ordinary traffic, and then the usual side footpaths. This forms the upper deck of the "avenue." The lower deck has side footpaths, van roads immediately under the ordinary roadway above, and a central space for stores, into which, conceivably, the contents of vans might be temporarily unloaded. Water, gas, and electric mains are accommodated in suitable subways under this lower road. A variation of the design consists in arranging the motor car road down below, in the space set apart for stores, but the suggestion to banish automobiles in this way from the light of day fails to appeal to us. In what the authors call the country sections of their avenues, the upper deck simply comes down to the ordinary road surface, and the subway disappears.

The upper decks of the main avenues are designed to cross existing streets at a sufficient height to enable the ordinary traffic to pass underneath them, and would be connected with existing streets at intervals by side "approach-roads," with a gradient of 1 in 30.

The scheme, it will be observed, is elaborate and comprehensive. Its originators have thought it out in almost every detail. There can be no doubt that its adoption, even in the four main directions now proposed, would enormously facilitate access to the central portions of the Metropolis. But shall we ever see it take practical shape? There is the eternal bugbear of vested interests which paralyses nearly all reform schemes of this kind from their very conception. And the cost of acquiring the necessary land, as so large a portion of it is covered by buildings, would be enormous. To many people the scheme will be too strongly reminiscent of Edward Bellamy's "Looking Backward," for them to entertain much hope of ever seeing it realised in practice. On the other hand, it is only fair to recognise that the proposers bring forward carefully compiled statistics to show that such a scheme ought to be capable of yielding a profit that would provide an adequate return on capital expenditure. Something of the kind, at any rate, will have to be attempted, and attempted seriously, in the near future, if the trade and prosperity of London is to be saved from paralysis by congestion.

Recognition of the Motor Boat.

Everyone is aware of the importance of the Board of Trade in matters relating to engineers serving in the Mercantile Marine. In the regulations respecting the examination of engineers which have come into force this year, we are pleased to notice a decided recognition of the growing use of the oil motor at sea.

In pursuance of the Merchant Shipping Act, every passenger vessel must carry at least one engineer holding a Board of Trade certificate. Hitherto the examination on which such certificates have been granted contained no specific questions on the oil motor. So that while an oil-driven passenger boat was legally compelled to carry an engineer who had passed his Board of Trade examination, and was therefore presumably qualified to manage a steam engine, there was no guarantee whatever that he possessed the requisite knowledge to look after an oil motor.

In the new regulations above mentioned, however, a sample set of questions relating exclusively to the oil motor are for the first time introduced among the usual list of similar steam engine questions which are published to serve as a guide to the standard of these examinations.

The presence of these questions must be welcomed as an indication of a progressive spirit, for they will at least ensure some study of the subject by those sitting for the examination. We hope, however, that matters will not end here, and that the Board will before long see their way to granting a special certificate to the marine oil-motor engineer. Doubtless there are members of the Automobile Club with special experience of motor boating who could be of considerable assistance to the Board of Trade in forming a satisfactory basis for such an examination. The step would be unquestionably one in the right direction, for while it would enable engineers to specialise in only one of the subjects, it would not prevent them from obtaining certificates in both, and this would be much more satisfactory than the present system of making oil-motor engineers study steam engine machinery when they have no intention of turning it to practical value. An examination can hardly ever prove sufficient qualification for practical work, but that is not altogether the point; the possession of such a certificate places its possessor at once on a different footing, and the fear of losing it is a better guarantee of careful work than can well be extorted from an engineer not so endowed.

Another Form of Blackmail.

We last week alluded to the very serious and growing evil of attempts on the part of chauffeurs to blackmail the manufacturers of cars which it is their duty to drive and keep in order. We then dealt with one aspect of this general question. There is another which is equally serious, both for manufacturers and car owners, and is particularly irritating and unpleasant for the latter. We refer to the repair question. As a rule, any serious repair to a car has to be effected by some manufacturer. When a car needs such treatment there are a good many chauffeurs who, before taking their employer's car to be repaired, make a tour of the repairing works, and ascertain beforehand which of them allows the highest commission. Needless to say that is the repairer to whom, quite irrespective of his merits, the car finds its way. This is stage No. 1 of the trouble. But soon the intelligent chauffeur begins to reflect that the last time the car went wrong he found the commission on the repairs very acceptable, and then the car is *prompted* to go wrong again, with the result that further repairs are needed, and the chauffeur draws further commission, besides having a day or two's holiday from an occupation which, however absorbing he found it at the start, has, perhaps, palled upon him in time. Now this sort of thing is just as bad for the industry, as far as it is practised, as the other form of blackmail to which we referred last week, for it is just as likely to disgust owners with their vehicles and to diffuse a general impression of the unreliability of the modern automobile among the public at large. It is particularly injurious, too, to the national industry, because it is a game that can be played much better with the cars of the less generally known makers than in the case of firms of world-wide reputation. Only growing knowledge on the part of car owners will really be ultimately successful in putting a stop to abuses of this kind. In the meantime we would recommend car repairers to take the same line as we recommended in the case of car manufacturers, and inform the secretary of the Automobile Club of all cases in which drivers attempt to extort commission on repairs. Repairers will probably be in general the more willing to adopt this line, as the demands of unprincipled drivers have in some cases become so excessive as to render it not worth their while to undertake the business. The repairing industry is a growing one, and in its interests and those of automobilism generally, we cannot too strongly recommend the adoption of the line we have suggested.

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A Progressive London Magistrate.

Most of the features in the case in which Mr. Charles Ashley was summoned before Mr. Lane at the West London Police Court, for exceeding the 20-mile limit, were of the type with which we have already become familiar under the new Act. There was the measured distance, and the time working out to precisely so many miles an hour without fractions of any sort, which in itself is a remarkable coincidence, while the two stop-watches used, by one of those further miracles or the dispensations of Providence which only occur in the case of police prosecutions, recorded exactly the same time within the smallest registerable fraction of a second. Mr. Staplee Firth, as usual, defended the motorist, and, as usual, caustically commented on these amazing coincidences. The two new features of the case were to be found in the facts that the police had arranged to be represented by counsel and in the attitude of the magistrate. The first feature is an excellent one, and Mr. Firth is certainly to be congratulated in having so handled many of these cases as to bring the police authorities to this change of tactics. For counsel have to be paid fees, and when a barrister has been paid there will be very little out of the fines, even if the case is successful, to go to the relief of the rates. The second important feature of the case was that the magistrate was obviously unsympathetic to the prosecution. He had, he said, often noted cars going at a high rate of speed, but was convinced there was no danger, as they were so perfectly under control. When, too, Mr. Wontner, who represented the police, objected to expert evidence designed to impugn the validity of the stop-watches, saying that "the police felt that the evidence of stop-watches ought to be accepted," Mr. Lane observed, "Well, these cases are bound to lead to friction between the police and motorists." Mr. Wontner's contention, it must be admitted, is distinctly naive. Doubtless the police always *feel* this, but it is the point on which they have lost nearly all their cases since the commencement of the year.

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Requirements of Colonial Cars.

The exportation of British-built automobiles to the various Colonies continues to increase satisfactorily. The increase would probably be even more rapid if British manufacturers would take more generally into consideration the special conditions which prevail in many of our Colonies, particularly, for example, in Australia, and design special types of car better suited to meet the local requirements. We learn from an Australian source that the 8 or 10 inches clearance frequently allowed in this country is quite inadequate there, except in the near neighbourhood of the towns. In what is called the black soil country of Queensland and New South Wales such cars would be quite impracticable. The result is that many admirable vehicles which, if somewhat differently designed, would have been capable of giving a good account of themselves in doing valuable pioneer work up country, have been brought back to the towns, leaving the out-of-the-way districts to the undisputed sovereignty of the horse and his congeners. In general, therefore, for Australia, as for South Africa—a matter with which we have already dealt—motor vehicles should be designed with considerably more clearance. This need not necessarily mean a great increase in the size of the wheels, nor a serious rise in the position of the centre of gravity. It is specially important that all vulnerable parts of the electric ignition system—commutators, tremblers, &c., should also be brought well up, owing to the occasional need of passing through much deeper fords than are general at home. The alterations in design are so very trifling, and the necessity for them in the case of cars designed for Colonial use so paramount, that home manufacturers would be certainly well advised to adopt a modified type of design for cars that they intend exporting to the Colonies.

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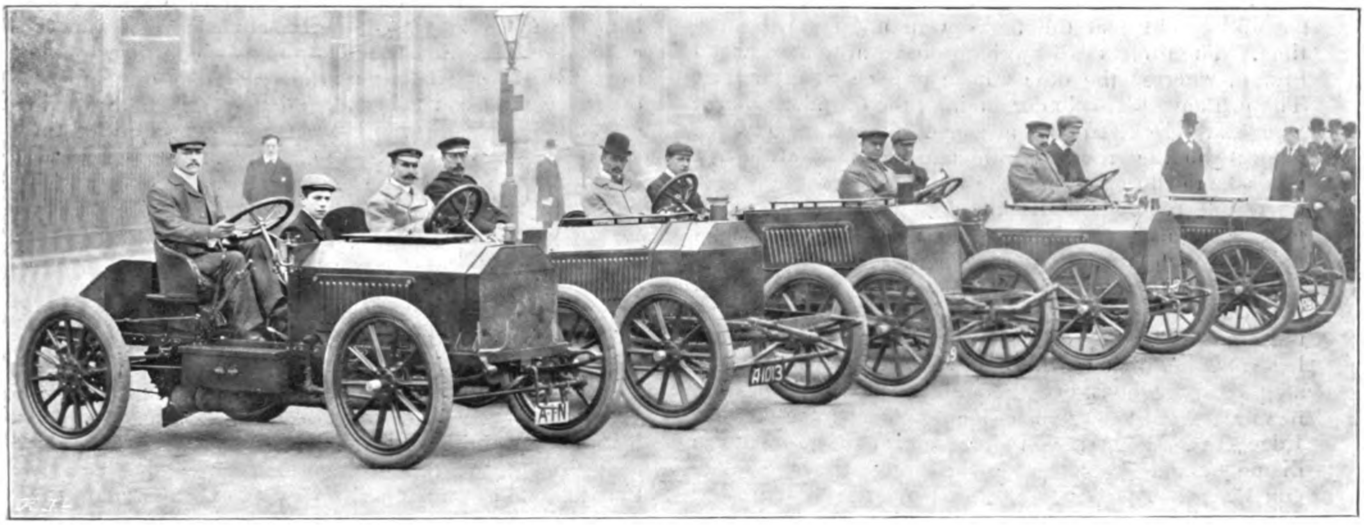
Tyre Depreciation and Steering Gear.

Greater even than side-slip is the importance of tyre depreciation to automobilists, very few of whom apparently realise the important bearing of the steering gear on both these vital questions. Ever since Lenkensperger, of Munich, invented the pivoted steering axle (more generally associated with the name of Ackermann, who took out the English patent rights in 1818), manufacturers have been faced with the difficulty of truly compensating the steering gear to suit all curves. How serious this lack of compensation really is has been very ably brought out in an article by Mr. C. H. Gale, A.M.I.C.E., which we publish elsewhere. Mr. Gale has made a special study of this important question, and not only should his contribution prove of interest to our readers generally, but be of actual practical assistance to designers and manufacturers of automotor vehicles. The real significance of imperfect steering gears is very closely brought home in one paragraph of Mr. Gale's article, where he shows that for every degree of error the side scraping of the wheel over the road is no less than 92 feet in every mile travelled on a curved path. When it is remembered that, even when driving on a straight road, one is always steering, the importance of eliminating even the least rubbing action between the wheels and road becomes at once apparent, if the life of the tyres is to be of any consideration whatever. Imperfect steering gears are also conducive to side-slip, for, as Mr. Gale points out, if the tyre is mechanically displaced laterally on the road by anything but true rolling motion, its initial resistance to skid must have been overcome, and it can, therefore, no longer be relied upon to give stability in that direction. Thus what might be otherwise a most valuable asset in the tyres is entirely discounted by the imperfections of the steering gear. Mr. Gale does not come forward with complaints only, he has suggestions for improvements to offer, and we can only hope that they will receive their due consideration at the hands of all interested in the perfection of the automobile.

The mystery of the two Highgate policemen, one of whom declared he could run at a pace of 60 miles per hour, while the other maintained he was equal to 50, has been solved. According to *Land and Water*, a gentleman who is in the habit of indulging in a little staid equestrian exercise procured a police stop-watch (of the kind which usually figure in motor car cases). To his surprise the timepiece demonstrated irrefragably that his quadruped was proceeding at the record, not to say break-neck, speed of 75 miles per hour. Doubtless it was with some such instrument that the Highgate policemen had estimated their own rate of speed. So we may acquit them of intent to deceive. Perhaps!

THE BRITISH GORDON-BENNETT RACERS.



GORDON-BENNETT CUP RACERS.—The Five Napier Cars entered for the Eliminating Trials, and presented for examination last Saturday. The drivers are, respectively, reading from left to right: 1. Mr. W. Clifford-Earp, (2) Mr. S. F. Edge, (3) Lieut.-Col. Mark Mayhew, (4) Mr. John Hargreaves, (5) Mr. J. W. Stocks.

OF the British cars entered for the eliminating trials, those which were presented for inspection at the Automobile Club garage on Saturday last included five Napier, three Wolseley, and three Darracq vehicles, the Wolseleys arriving first early in the morning, and the Darracqs turning up last, but well up to the specified time—12 o'clock. The judges appointed for the purpose of inspecting them were Major Lloyd, Mr. Worby Beaumont, Colonel Crompton, Mr. Lyons Sampson, Captain Nugent, Mr. M. O'Gorman, Mr. E. H. Cozens-Hardy, Mr. Claude Johnson, and Captain Bowman-Manifold. The following are the weights of the various machines:—The five Napiers, 2,182, 2,111, 2,199, 2,177, and 2,144 lbs. respectively; the three Darracqs, 2,203, 2219, and 2,205 lbs. respectively; and the three Wolseleys, 2,163, 2,157, and 2,191 lbs. respectively.

The Napier Cars.

THE five Napier cars are of four different sizes, the most powerful of which is Lieut.-Col. Mark Mayhew's 100-h.p. vehicle, of which we gave an illustration on January 16th last. Next in point of size is the 80-h.p. vehicle, which will be driven by Mr. S. F. Edge, a photograph of which appeared in our issue of April 2nd. Of the remaining three cars there are two 60-h.p. vehicles, to be driven by Mr. John Hargreaves and Mr. Clifford Earp, while Mr. Stocks' car is a 50-h.p. In general respects all these vehicles are of similar design, though the 80-h.p. and the 100-h.p. are possibly the most interesting in point of detail, and even these differ from one another in several important respects. As far as can be gathered, Lieut.-Col. Mark Mayhew's car, which has recently figured prominently at Nice, is

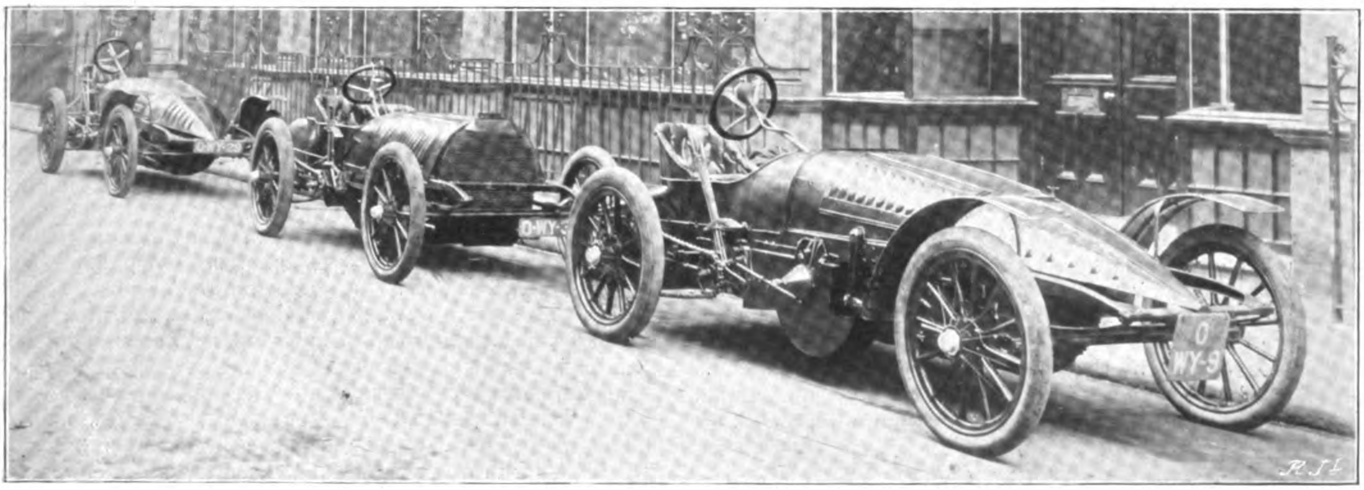


Photo by Argent Archer.

GORDON-BENNETT CUP RACERS.—The 72-h.p. Wolseley Racer (in the centre) and the two 96-h.p. Wolseley "Beetles," outside the Lacre Motor Car Company's premises in Poland Street, after weighing up.

actually the fastest, although it is a good deal heavier than the others. Mr. Edge's car is considerably lighter; when weighed last Saturday at the club it scaled 60 lbs. below the limit (1,000 kilogs. or 2,204·6 lbs.), although we understand that the tanks were not empty at the time. The three smaller vehicles have armoured wood frames, whereas the others have pressed steel frames. They all have four-cylinder engines, the cylinder walls of which are jacketed by a single aluminium casting. Except on the 100-h.p. vehicle, the inlet-valves are atmospherically operated; the valves are of the Napier quadruple type. All the clutches have metal-to-metal friction surfaces, and those on the three smaller vehicles are fitted with four engaging springs. Some little modifications are found on the larger clutches, amongst these being that three springs are provided instead of four, and the clutches are not quite the same even on the two big cars. A high tension system of ignition has been adopted throughout, but the only racer which has the new synchronised Napier ignition apparatus is Mr. Edge's car. The tyres on all these cars are 34 inches in diameter, and except on the two largest they are all of equal size, being 95 mm. wide; on the 80-h.p. and 100-h.p. racers, however, the driving wheels have 120 mm. tyres instead. The tyres are of the Dunlop non-skid type. Some little difference exists on the different machines in the system of lubrication which is adopted, for, whereas on the two 60-h.p. and on the 50-h.p. vehicles, an automatic mechanical lubricator is used, a drip-feed, supplemented by a hand pump, is found on the 80-h.p. and 100-h.p. models. The gear-boxes on all the cars provide for three forward speeds and a "reverse," and are so designed that a direct-through-drive is obtained on the top speed. The gearing on the two big vehicles is differently arranged in many important respects in comparison with last year's models, and is not the same, even on these two large cars. On Mr. Mayhew's car, roller-bearings are used throughout the gear-box, but plain bearings are fitted in the gear-box on Mr. Edge's car. A new design of back axle, too, has been adopted on the 80-h.p. vehicle, though the axle on this machine is the same as on the others inasmuch as roller-bearings are used for it, and the thrust of the bevel-wheels driving it are taken by ball-bearings.

The radiators have been very considerably increased in size this year; they are of the honeycomb type, and are provided with belt-driven fans. In the two larger cars, the circulating-pumps are chain driven and on the smaller vehicles these pumps are driven direct off the engine. The wheel-base is in all cases long, and on Mr. Edge's vehicle is 8 ft. 8 ins. We are given to understand that the h.p.'s mentioned may be taken as fairly accurately representing the actual power which the different engines give on the brake at normal speed, and that the normal speed of the various engines is practically the same. It will be very interesting to notice the relative performances of the different cars, particularly of those to be driven by Lieut.-Col. Mayhew and Mr. Edge; the special advantages aimed at in the 80-h.p. vehicle are not so much actual speed capabilities, under favourable conditions, but uniform high speed and quick acceleration, owing to the considerable reduction of weight that accompanies the reduction of power.

The Wolseley Vehicles.

The three Wolseley cars entered include two of the more recently designed 96-h.p. cars, of which we gave illustrations and some particulars in our two last issues, and the 72-h.p. vehicle — described with illustrations the previous week. The larger machines have been designed and built in a remarkably short space of time, and not only are of particularly clever design, but appear to be of extremely good workmanship and finish throughout. Their finished appearance is well shown in the illustrations which we are able to give this week; it is very different from that of any other racing car that has previously appeared. The shell-like shield projecting forward from the front of the bonnet is not only intended to act as an effective wind-cutter, but also to direct a powerful current of air through the large circular multitubular radiator. As already mentioned, the four horizontal cylinders lie alongside one another, and in this respect they constitute a radical departure from previous Wolseley engines—including the 72-h.p. car. The cylinders project forwardly from the crank-chamber, and have atmospherically operated inlet-valves. A very noticeable feature of these powerful racers is the arrangement of the mechanician's seat on a very low level, with a deep well to accommodate his feet. In order to arrange for this, the change-speed-gear lies on the right side of the car, and it is only the differential countershaft that passes across to the other side. An extraordinarily small starting handle is employed, considering the size of the engine, and this is rendered possible by entirely cutting out three of the cylinders and by putting the fourth on half compression, when starting.

The engines on these large cars are—contrary to usual Wolseley practice — fitted with governors, but the governors are mounted in a quite unique position, being fitted to the rear end of the fan spindle. They act upon the throttle-valves and are subject to the control of one of the hand levers that is fitted above the steering wheel — the other small hand-lever alongside it varies the time of ignition. The fan lies immediately behind the radiator, and is driven by a belt from a longitudinal shaft projecting forwards from the engine. This shaft primarily drives the circulating pump through worm gearing. The pump, the fan, and the governor are all rigid with the radiator and are flexibly connected with the engine. The radiator has four rows of tubes, those in the rear row being straight and those in the front row being bowed out forward.

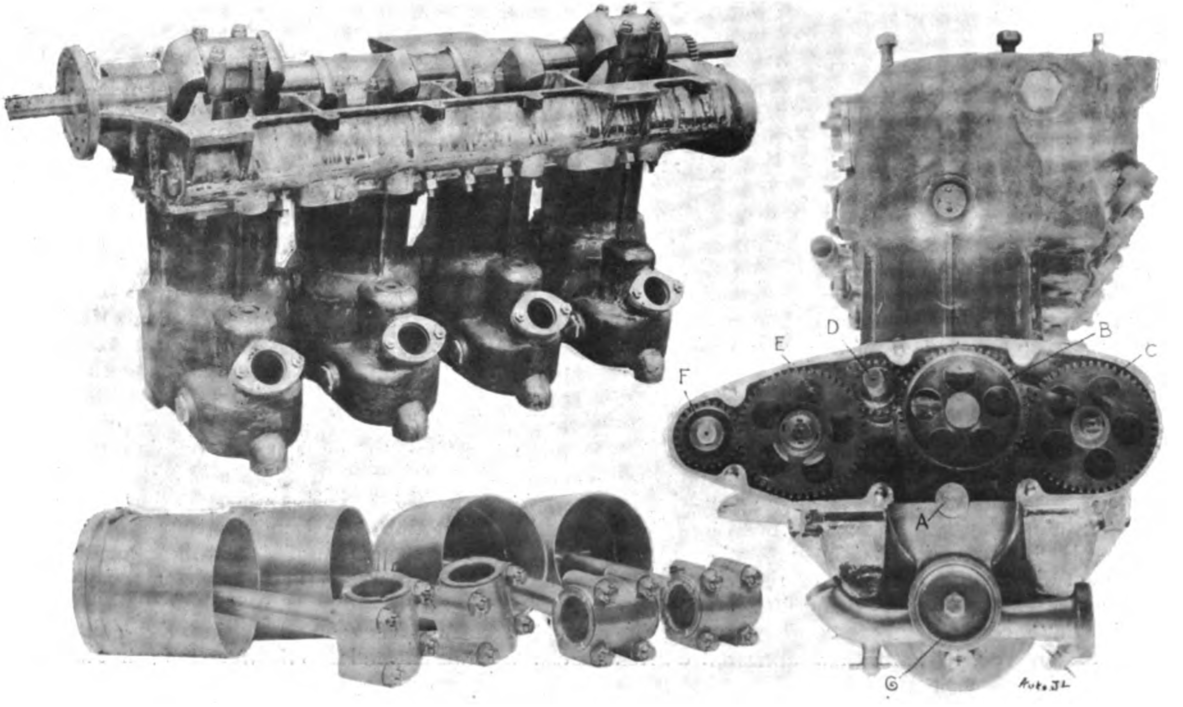
The main clutch is operated from the foot-pedal through a rod lying outside the frame and the dust-proof casing, and the necessary adjustment for the clutch is provided by a left and right-hand connection in this rod. Provision is also made for enabling the mechanician to prevent the clutch from slipping, if at any time it should tend to do so, and for this purpose there is a small hand-lever mounted to the left of the foot-pedals near to him. The main petrol tank lies at the back of the car on a lower level than the carburettor, and there is a strong shield beneath it to prevent it from being fractured by loose objects flying up from the road. A pressure is normally maintained in this tank from the exhaust gases, and a hand-pump is also fixed near the mechanician's seat for the same purpose. Large, and very easily removable, filler-caps are fitted to the tanks, and there is a supplementary petrol tank mounted on a higher level than the carburettor, to feed the engine, whilst the main tank is being filled. The change-speed-gear provides for four forward speeds and a "reverse," is driven by a Renold's silent chain, and has its shafts mounted in ball-bearings. Dunlop tyres are fitted. The 96-h.p. vehicles will be driven by Mr. Charles Jarrott and Mr. Campbell Muir, and the 72-h.p. car by Mr. Girling.

Photo by Argent Archer.

GORDON-BENNETT CUP RACERS.—The three British-built Darracq Cars en route after examination.

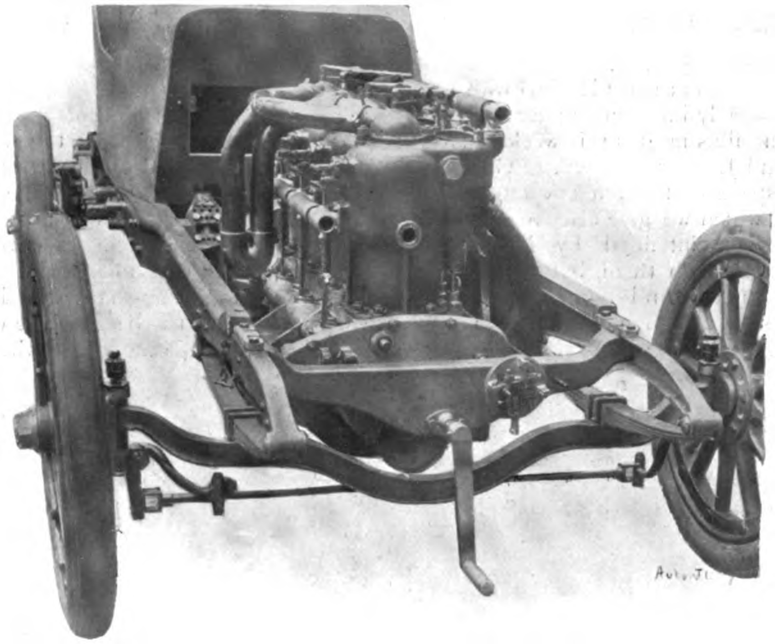
The Darracq Cars.

The three Darracq vehicles are all identical with one another and are of extremely imposing appearance, as will be gathered from our illustrations this week. They have been built by G. and J. Weir, Limited, of Glasgow, in a remarkably short space of time, a few interesting particulars in regard to which we give elsewhere. The undertaking has been superintended by Mr. Hugh Kennedy, who was formerly with them, but is now with the Kennedy Motor Company, and by Mr. T. C. Pullinger, of Messrs. Marston and Son, Wolverhampton. They, like the Napiers, are of the live-axle type, and, like all the competitors for the Eliminating Trials, have 4-cylinder engines. Some of the details of construction are well shown in the other accompanying illustrations, which are of the front of the chassis, with the engine exposed to view, and of the more important parts of the engine itself respectively. The cars are constructed with pressed steel frames, made by the Leeds Forge Company, and the engine is covered by a large square-shaped bonnet that meets the honeycomb-radiator in front, and the boat-shaped body, with its curiously-shaped dash, at the back. The engine has all its four cylinders cast separately, and these are bolted as usual



Parts of the engine of one of the British-built Darracq Gordon-Bennett Racers. These show a view of the cylinders (inverted) fixed to the upper part of the crank-chamber, with the crankshaft in position; the four pistons with their connecting rods; and a view of the engine from the front, with the gear-wheels driving the camshafts, the fan, and the magneto, exposed to view.

to a large aluminium crank-chamber. The bore of the cylinders is 160 mm., and the stroke is 140 mm. The inlet-valves, which are of large size, are fitted centrally in each cylinder-head with the spindles projecting vertically upwards. The valves are actuated by rocking levers and vertical push-rods from the same cam-shaft as the exhaust-valves, the cam-shaft and the exhaust-valves being on the left side of the engine. Both low-tension and high-tension ignition plugs are fitted, all of these being on the right side of the engine. The magneto for the former is fixed on this same side and is gear-driven from the cam-shaft that operates its igniters. The commutator for the high-tension system is fitted right in front of the car just beneath the radiator, and the wires from the coils on the dash are led through a neat casing to the ignition plugs. The arrangement of the gear-wheels on the front of the crank-chamber is well seen in one of our illustrations, where it will be noticed that there are quite a number of these enclosed in the same casing. The pinion on the crankshaft, A, not only drives the idle half-speed wheel, B, but also the circulating pump, G, beneath it. The large and small spur-wheel, C and D respectively, both mesh with the wheel, B, the former being on the front end of the cam-shaft operating the inlet and exhaust-valves, and the spindle of the latter being used for driving the fan ; the commutator is mounted in line with the cam-shaft so that it, too, is driven by the wheel, C. The spur-wheel, E, is driven by the wheel, D, and it drives the wheel, F ; the shaft upon which it is mounted carries the cams for operating the low-tension igniters, and the wheel, F, is upon the magneto-shaft. All four cylinders are fed from a single carburettor through induction pipes of very large size.



Front view of the chassis of one of the British-built Darracq Gordon-Bennett Racers, showing the engine fixed in position.

The main clutch has metal-to-metal friction surfaces, and is, as usual, fitted into the flywheel. The change-speed-gear gives three forward speeds and a reverse, and is so arranged that a direct-through-drive is obtained on the top speed. Nickel steel is used for the gear-wheels, the axles, and the shafts, this having been obtained from Messrs. Firth, of Sheffield. The foot-brake and the hand-brake act direct upon the hubs of the rear wheels, both internal and external brakes being fitted to them as on the Wolseley racers. The centre of gravity of the cars has been kept very low, and their appearance gives the impression that they should be capable of attaining very high speeds. The wheels are shod with Michelin tyres manufactured by the North British Rubber Company, of Castle Mills, Edinburgh, those for the driving-wheels being 815 by 120 mm., and those for the front wheels 810 by 90 mm. The Darracq cars are to be driven by Messrs. Rawlinson, Henri, and Edmond.

HOW THE DARRACQ GORDON-BENNETT RACERS WERE BUILT.

(From our Special Correspondent.)

Some ten weeks ago the French drawings for the British Darracq racers reached Cathcart, a suburb of Glasgow, where the works of Messrs. G. and J. Weir are situated. How it came about that the famous French house decided to have the cars built there need not be discussed. The writer is satisfied, however, that no better selection of a manufacturing firm could have been made, and with this opinion, Mr. Rawlinson, who has supervised the work on behalf of the Darracq Company, entirely agrees. Ten weeks ago the drawings arrived, and the first part of the race against time consisted of converting every dimension from metric measurements into their equivalents in feet, inches, and parts of inches, with all the changes entailed in screw threads to suit the Whitworth system. Some time was necessarily taken up in this way, and in the preparation of moulds and patterns before a start could be made ; but some two months before the date when the cars were to appear in London, the engineers were turned on to the job, and from that time till they were completed there was practically no cessation of work. Day and night, Sundays and holidays included, the work went on, as many as 150 men being occupied at one time on the machines. Before the work began the nature of the case was stated to the men, they were asked to do their best, and they responded loyally. Mr. Rawlinson was very emphatic in his praise of their behaviour, and of their workmanship. No better work, he said, was ever put into motor cars. In all, parts for four cars were made, the fourth being spare ; and an examination of these went far to confirm his opinion regarding the splendid character of the work and material. When the works were visited on the 14th—two days before the cars had to be produced in London—they were found to be well forward towards a finish, although a considerable number of men were still busy about them completing odds and ends of fitments, painting covers, and the like.

No expense has been spared in building these cars—cost has not entered into the question ; they are probably the most expensive motor cars ever produced, and their method of conveyance to London is indicative of the company's determination to attain their end at any cost. The cars were conveyed by special train leaving on Friday evening, the vans containing them being of a size and so illuminated as to permit of work being carried on during the journey, while dining and sleeping saloons were on the train for the use of the staff. The doings of these machines will be watched with very close attention in Scotland. Built as they have been by engineers who had never previously been engaged in motor car work, and under the circumstances described, defects might well be excused; but none are anticipated, and very great disappointment will be felt if their performances are not of the best.

GORDON-BENNETT ITEMS.

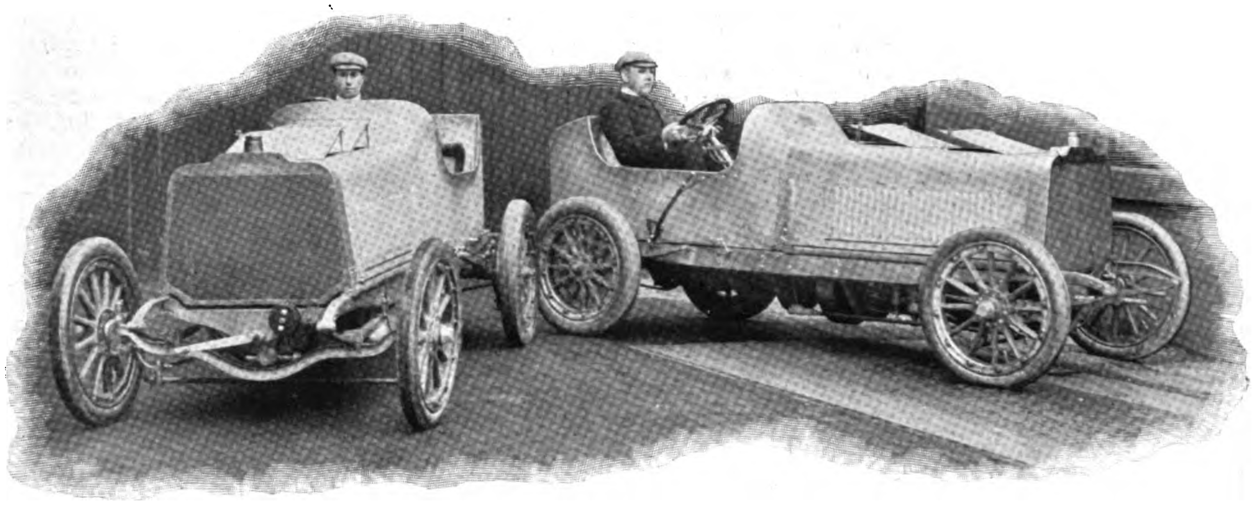
The hill-climbing events following the Eliminating Trials on May 10th, in the Isle of Man, will probably take place up Creg Willey's Hill (at Glen Helen) or Crellin's Hill (Douglas). The Ramsay to Snaefell road has also been under consideration.

That the new 96-h.p. Wolseley cars are running well was proved by Mr. C. Jarrott on Monday last. He started on his car from London early, arriving in Birmingham about 8 a.m., in time for breakfast, accomplishing the run without the smallest hitch.

In the event of Baron de Crawhez's car not being selected amongst the final three to represent France, he will then take charge of one of the "Pipe" cars on behalf of Belgium, the other two drivers for the "Pipe" cars being M. Lucien Hautvast and M. George Augiere. Both Augiere and De Crawhez's reputation should make them of enormous value to the Pipe house, the former as the holder of the world's speed record until the recent remarkable performances by Rigolly at Nice, and in Baron de Crawhez was found last year the winner of the Circuit des Ardennes.

M. A. Clément, jun., the very promising son of a clever father, will be a welcome addition to the Bayard-Clément team of drivers.

The first of the Hotchkiss racers made its first real trial trip on the roads last Monday, and has apparently proved itself to be a fast and "flexible" car. These machines have been designed by Mons. Terrasse, and are of the chain-driven type. They have torpedo-shaped aluminium bodies, and the four-cylinder engine is mounted sufficiently far back to about equalise the weight on the four wheels. The wheel base is 3 metres. The engine develops 100-h.p. at about 950 revolutions per minute, which is the normal speed, but it is intended to run considerably faster than this. The change-speed-gear is arranged so that it gives a direct through drive to the countershaft on the top speed.



GORDON-BENNETT CUP RACERS.—Two of the Darracq Racing Cars, before leaving the Glasgow works of Messrs. G. and J. Weir for examination. The Managing-Directors of Messrs. G. and J. Weir are at the wheels of the cars, Mr. William Weir on the left and Mr. Richmond on the right.

The drivers selected for the various teams which will take part in the French Eliminating Trials have now been officially issued by the A.C. of France, and are as follows:—

De Dietrich and Cie—MM. Gabriel, Charles Jarrott, Baron de Forest.
Panhard and Levassor—MM. H. Farman, Teste, Tart.
Bayard-Clément—MM. Hanriot, Guders, A. Clément.
Darracq and Cie—MM. Baras, Béconnais, Wagner.
Mors—MM. Salleron, A. Léger, Lavergne.
Richard-Brasier—MM. L. Théry, G. Caillois, Stead.
Gobron—MM. Rigolly, Burton, Duray.
Hotchkiss and Cie—MM. Baron P. de Crawhez, A. Fournier, A. Amblard.
Turcat-Méry and Cie—MM. H. Rougier, de La Touloubre.
Gardner-Serpollet—MM. Le Blond, Chanliaud, Pelser.

It will be noticed that Henry Fournier is not named. He has definitely decided to forego driving one of the Hotchkiss cars, and has been replaced by M. Amblard. The main reason for Fournier retiring is that the enormous pressure of business has compelled him to abandon the hope of being able to devote sufficient time necessary to racing.

The price of 50*s*. per place, it is reported, has been fixed for seats in the Taunus Grand Stand being erected at the starting-point at the Saalburg. This stand will give accommodation for about 3,000 persons. A number of other stands are to be erected in not quite such advantageous positions, and for these the prices charged will be proportionately lower, ranging down to 5*s*. in some cases.

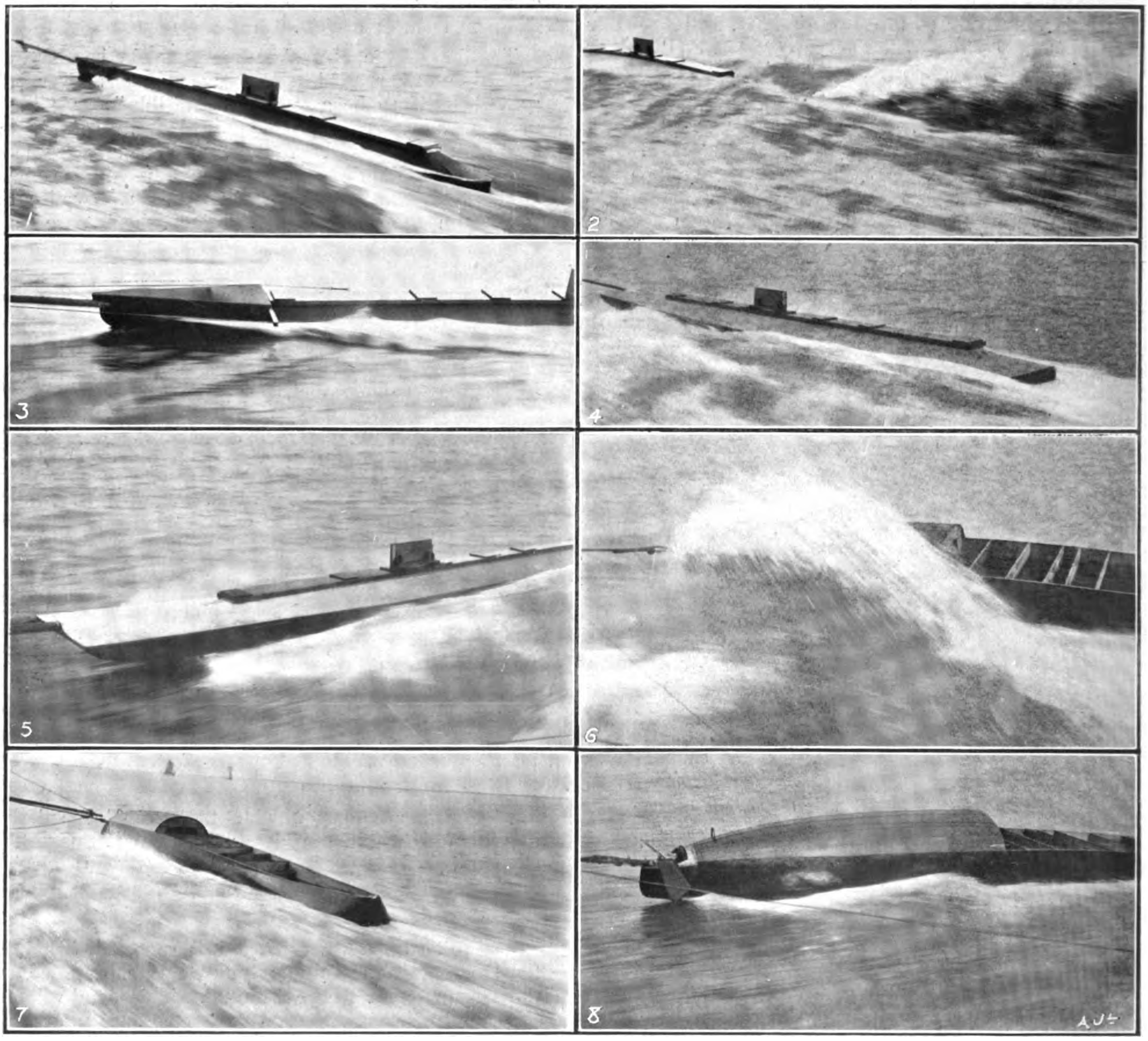
In addition to the gala dinner to be held in the Homburg Kursaal on June 18th, the day after the race, an important subscription ball is to be held on June 21st.

Alexander Winton is reported, by cable, to have entered his Bullet No. 2 for the American team.

MOTOR-BOAT HULL EXPERIMENTS.

Mr. S. F. Edge and Messrs. Napier are determined that it shall not be their fault if the British motor boat fails to be supreme on the water. Very rightly they feel that while England may be willing to share the palm for land automobile development, she ought as regards marine automobilism to be without a rival.

The design of engines, reversing gear, and all the other mechanism required has been engaging the attention of Messrs. Napier and Co. for a long time past, and they are now practically ready with the whole of the machinery with which they intend to defend the British International, and the Gaston Menier Cups. As regards the construction of the hull, they are co-operating with Messrs. Yarrow, the world-renowned torpedo boat constructors, and in conjunction with them have been carrying out a number of important experiments designed to ascertain the best possible lines for boats of the kind.

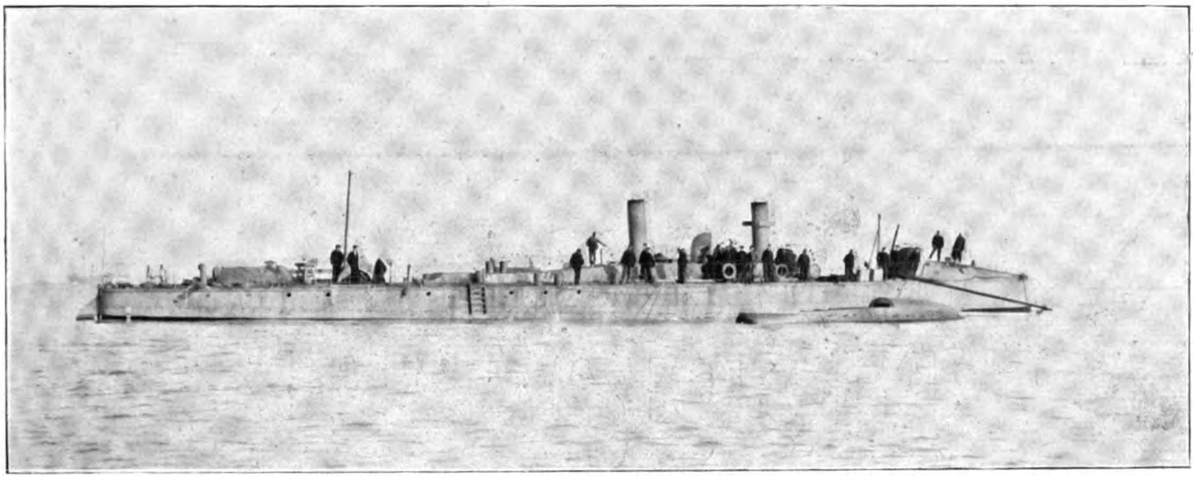


The Napier Hulls under test.

The question of hull design is far more important and difficult than most people have the slightest idea of. It is not merely a question of engines and propellers, or even perhaps mainly such a question. The shape of the vessel itself is of supreme importance, and this fact is well illustrated by the photographs we reproduce of different full-sized models for Napier boats undergoing a special series of tests, for which we have to thank Mr. S. F. Edge.

As shown in the photograph on the next page, a new turbine torpedo-boat was used for towing the various models alongside at different speeds by means of a boom, so as to keep them free from wash, and in this way enable the wave forms produced to be ascertained before fitting the engines. The hulls were attached to the boom through a dynamometer, and the torpedo-boat run at various rates of speed, from 20 to 25 knots. The photographs which we reproduce being taken from the torpedo-boat during the tests. In this way the power required for propelling each of the boats at a given speed was also ascertained.

Of these, No. 1 shows a model of the old Napier boat being towed at 20 knots. No. 2 shows the same craft



A Napier Model Hull, alongside the Torpedo-boat, attached to the boom ready for towing.

proceeding at 25 knots, with greatly increased disturbance of the water, proving that this model of boat is, under any condition, quite unsuitable for 25-knot speed.

At these high speeds the problem of importance is the shape both of the hull and the stern wave which are produced. Too big a bow wave not only throws too much water on board, but causes great resistance, while a badly formed stern wave seriously impedes progress.

The difference in the effect produced by the different hulls is well shown in the photographs. No. 3 gave a good bow wave but bad stern wave. Thus No. 4 gives a very clean run from the stern, but, while found to be excellent in smooth water, was quite hopeless when the water was rough, and the steering would have been unsatisfactory. No. 5 is another photograph of the same model, showing the water indicator for ascertaining whether the boat is kept on a level keel or not. No. 6 was regarded as a very fine model until brought to high speed, and then, although it was shown to consume very little power, the bow wave threw a great deal of water on board, and would make the steering difficult. The results obtained with No. 7 were excellent, as it gave an exceedingly clean run from the stern, and a small bow wave. No. 8 was even better still, there being hardly any bow wave at 25 knots = 28·788 miles per hour. The Napier Company have been, it is needless to say, at enormous expense in carrying out these experiments, and the amount of initiative and resource they have displayed is remarkable.

After conducting such extended and interesting experiments, success is certainly deserved, and it must be remembered that at any rate a large part of the Company's failure to attain it at Monte Carlo was due to their determination to make their boats practically noiseless by water-jacketing the exhaust. When the difficulties incidental to this new departure are overcome, we have every hope that the Napier boats will give a good account of themselves in the contest for the International Cups.

The Ohio Legislature is contemplating dealing with the nuisance caused by unauthorised persons interfering with motor cars in a distinctly original way. In the case of horse-drawn vehicles the trouble has been met in that State by laws governing the wrongful use of horses and other dumb animals. The Ohio Legislature proposes to solve the problem by including the automobile among "other dumb animals."

From the 1st inst. the Ladies' Automobile Club of Great Britain and Ireland, which now boasts of over 250 members, have been installed in their new premises at Claridge's Hotel, Brook Street, W., where every provision has been made for the comfort of the members. Although the club rooms are part of the hotel, the members have the advantages of an independent building, the premises having a separate entrance and a spacious hall. The very best taste has been displayed in the decorations, and a very large increase in membership should be the immediate result. It has been decided to have a uniform subscription and entrance fee for town and country members, viz., £5 5*s.* subscription, £3 3*s.* entrance fee. Supernumerary members who reside for the best part of the year abroad will pay a reduced subscription of £2 2*s.* The committee are arranging a tour to visit Homburg for the Gordon-Bennett Race, for which already seven cars are entered, and it is expected that several more will participate in the run. The secretary of the club is Miss K. D'Esterre Hughes.

A Bill was passed by the Guernsey Legislature on Friday, the 15th inst., the object of which is to provide proper regulations for the safe storage of mineral oils in general, and petrol in particular. The measure now awaits the Privy Council's assent so that it may become law. Referring to petrol, the maximum quantity which the merchant or dealer may store, conformably with certain regulations as to the nature of the building, its isolation, and so forth, is 2,000 gallons. But there is nothing in the Bill to prevent a merchant from owning two or more stores, though he would have to take out a separate licence for each. The following is worthy of notice as descriptive of the progress of automobilism in the island. In the course of the debate on the Bill it was mentioned that at the present time there were in Guernsey fourteen motor cars, six petrol motor launches, and twenty-four motor cycles. In The Automotor Journal for November 28th, 1903, referring to compulsory registration, it was stated that the number of automobilists in the island was twenty-two, among whom there were only five motor car owners.

THE WILSON-PILCHER PETROL CARS.—PART II.

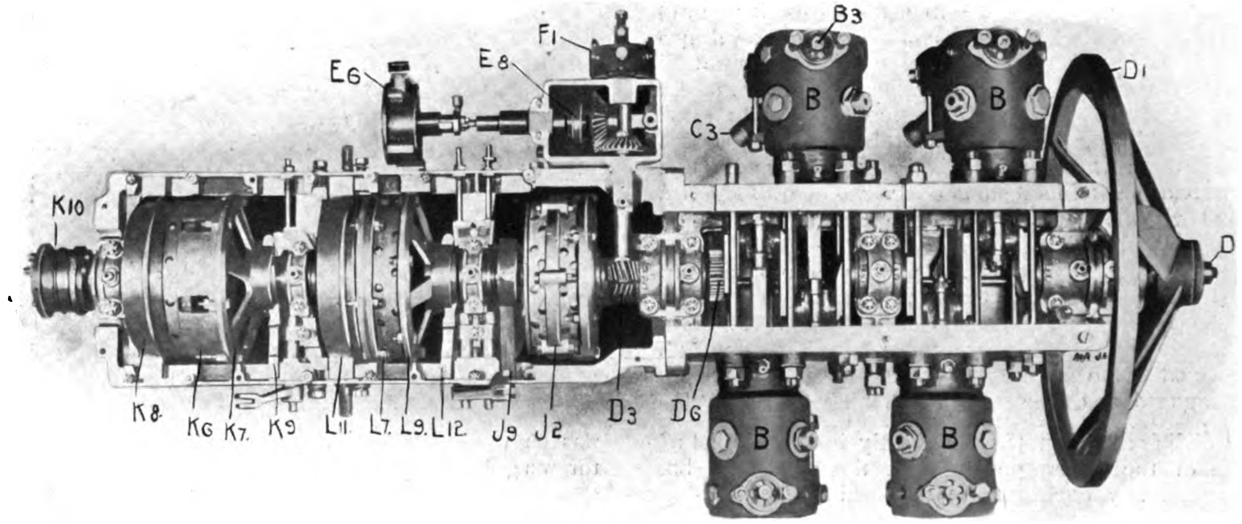


FIG. 8.—View of the Wilson-Pilcher Engine and Change-speed-gear from above, with the top of the Crank-chamber and cover of the Gear-box removed.

FOLLOWING our general description of last week, we now propose to deal with some of the most interesting details of construction in the mechanism of the Wilson-Pilcher cars, and are able, for the first time, to describe in full detail the very interesting change-speed-gear that is employed on these cars. Our illustrations this week refer more particularly to the 4-cylinder vehicle, but, as we have already explained, the design of both models is practically identical.

Fig. 8 is a general view of the engine and of the change-speed-gear from above, in which the top covers, both of the crank-chamber and of the gear-box, have been taken off. This illustration, taken in conjunction with Figs. 9 and 11, will be found to render this combined unit of the driving mechanism—with the fly-wheel, D^1, in front, and the universal coupling, K^{10}, at the rear—particularly clear, the lettering of the various parts corresponding in all the figures as usual. Fig. 8 also shows the arrangement of the commutator, F^1, the oil-pump, E^8, and the water-pump, E^6, all of which are driven from the short transverse shaft which projects through the side of the gear-box, and is itself caused to rotate by the gear-wheel, D^3, on the crank-shaft. The commutator is fitted on the extreme end of this shaft, and the pumps are mounted on another shaft that is connected with it by bevel wheels, fitted inside the small separate casing as seen. In this illustration E^8 represents the eccentric that operates the plunger pump beneath it.

The Engine.

Fig. 9 is a view of the 4-cylinder engine from the *under* side, and in it the base of the crank-chamber has been removed, so that the cam-shaft, D^4, is exposed to view. The crank-chamber is made of aluminium, and the cylinders, B, are bolted to its sides by very long bolts which pass right across it. It will be noticed that the cylinder castings are so formed that, when bolted in place, the exhaust-valve, C, of one cylinder lies immediately in line with the exhaust-valve of one of the cylinders on the opposite side, although the cylinders themselves are sufficiently out of line with one another to allow each of the straight connecting rods, C^8, to operate upon a different crank-pin on the crank-shaft, D. A single exhaust-cam is, therefore, able to actuate two opposite exhaust-valves, and since the cam-shaft is also in line with the valves, although at right angles to them, two cams are sufficient for the four cylinders, and these cams exert a direct end thrust on them through the sliding push-rods, C^6. In Fig. 9 one of the exhaust-valves only is shown in place, and one of the other valves—which, as already explained, can be removed complete with its seat—is seen lying alongside the engine. One pair of push-rods, C^6, only is shown, the other pair having been taken out, and it will be seen that the guide-casting, C^7, that holds the push-rods up in place from the under side, has also been taken off to show the shape of the push-rods. The guides for these rods are made of brass in two pieces; they are let in the sides of the aluminium crank-chamber and are bolted in place to it. The push-rods are fitted with rollers, which take the thrust, and reduce the wear of the cams.

The exhaust-valve castings, C, are fixed in place to the cylinders by the studs, C^4, and the joints between them and the main castings are made by metallic packing. The yoke, C^5, which actually presses the valve castings down in place is slotted at each end, so that it can be made to engage with the studs, C^4, without its being necessary to entirely remove the nuts from the studs. It is therefore very easy to remove an exhaust valve bodily, and it can then be "ground in" when necessary in comparative comfort. The valve head, C^1, is made of nickel, and this is securely fixed to the steel stem. In order to adjust the valve relatively to the push-rod, C^6, and thus to compensate for slight differences of thickness in the metallic packing above referred to, an adjustable

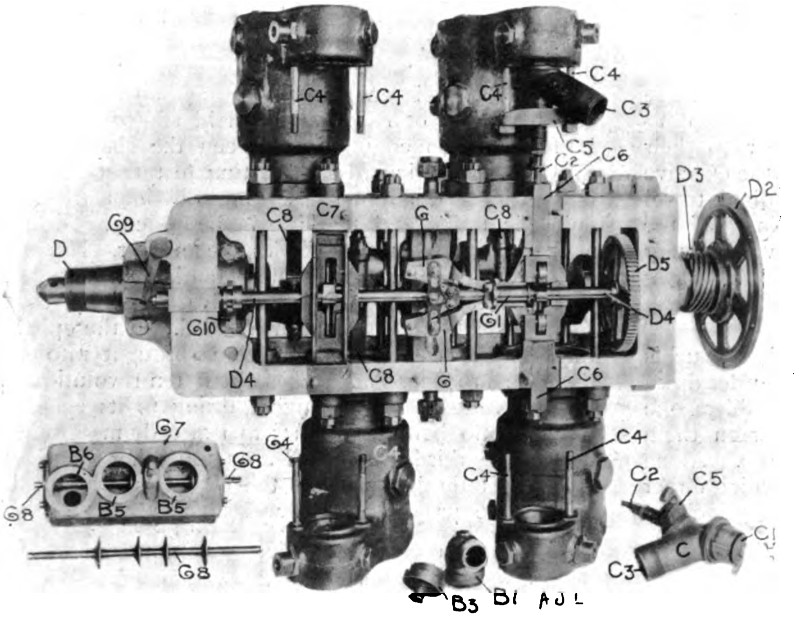


FIG. 9.—View of a 4-cylinder Wilson-Pilcher Engine from beneath, with the Base removed to show the Cam-shaft and the Governor, also showing the Throttle-valve, an Inlet-valve, and an Exhaust-valve, separately.

cap, C^2, is fitted to the end of the valve-spindle. This cap also forms a lock nut for the ordinary screwed cap against which the spring presses, and both caps are so designed that it is impossible for them to shake loose. For this purpose, the outer cap, C^2, has a cone-shaped projection, which fits inside a corresponding recess in the inner cone, and the projection is split radially so that when the caps are tightened up against one another the split cone is wedged inwards to grip the valve spindle. The exhaust gases are led out from the valve castings, C, to the flexible exhaust pipes at C^3, where a union nut is fitted.

The Governor.

The centrifugal governor, G, which is mounted on the centre of the cam-shaft, E^4, is well shown in Fig. 9, and is of particularly neat design. The governor-sleeve, G^1, is prevented from sliding longitudinally because it forms the journal in the bearing provided for it in the guide castings for the push-rods, C^6. As the speed of the engine increases, the governor therefore causes the cam-shaft to travel longitudinally, instead of the sleeve, G^1, and the exhaust cams are made of sufficient width to allow for this movement whilst still acting upon the push-rods; the object of this arrangement is to render the governor more positive. It will be noticed that there are two levers, G^9 and G^{10}, which engage with the cam-shaft near its forward end, the one outside the crank-chamber and the other inside. It is the lever, G^9, that is connected with the small hand-lever, G^3, on the steering-pillar—and enables the driver to regulate the normal speed of the engine in the manner which we have already described—and it is the lever, G^{10}, that is connected with the accelerator-pedal, G^6, and that enables the driver to suspend the action of the governor by acting direct on the throttle-valve. The lever, G^{10}, is connected direct with the throttle-valve, so that the governor normally controls the valve through this lever. The cam-shaft is driven from the crank-shaft in much the usual way by the spur-wheels, D^5 (Fig. 9), and D^6 (Fig. 8); the former being fixed to the cam-shaft, and the latter to the crank-shaft.

The Throttle-Valve.

One of the atmospheric inlet-valves, B^3, together with the induction pipe fitting, B^1—which is made to hold the valve down on its seat by the yoke, as already shown in Figs. 4 and 5—is seen lying beside the engine in Fig. 9, the branched induction pipe from the throttle-valve fitting being connected to the castings, B^1, by unions. The throttle-valve, too, is shown separately in this same illustration, one of the balanced valves, G^8, being seen inside its casting, G^7, and another of them separately alongside it. The explosive mixture enters the casting, C^7 at B^6, and finds its way into an outer compartment from which it can only pass to the induction pipes, at B^5, through one pair of the flat valves on G^8. When the valve is open the mixture flows inwards—to one induction pipe at a time—past two of the valves, and as they are very nearly the same diameter

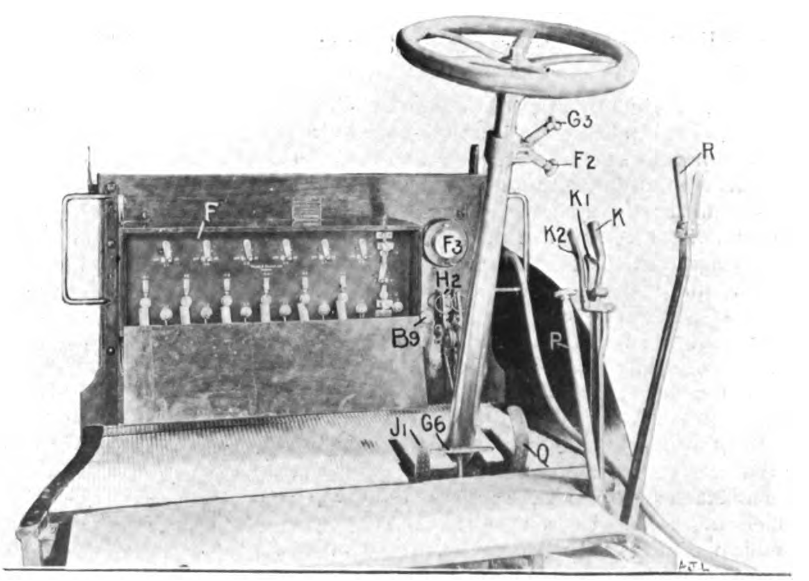


FIG. 10.—View of the Dashboard on a 6-cylinder Wilson-Pilcher Car, showing the Coil-box with the Cover open.

the combustible mixture tends to open the one valve with as much force as it tends to close the other, so that the valve is not moved by it. There is just sufficient difference in diameter in the four valves to allow them to be slid into place from one end of the casting, G^7, and they are all just sufficiently ground down on to their respective seats to give a slight taper to their originally square contact edges. In this way the effective size of the opening, relatively to the longitudinal travel of the valve-spindle, is such that "hunting" of the governor is reduced to a minimum, and very regular running of the engine on light loads is secured.

The Ignition Apparatus.

The interior of the coil-box, F, on the dashboard is shown in Fig. 10, the hinged front having been let down for this purpose. On the right are the two tremblers, one above the other, with a two-way switch between them for bringing either of them alternatively into use. Along the top, are the six low-tension switches by which either of the coils can be rendered inoperative, and either cylinder consequently put out of action. Beneath these low-tension switches are the high-tension spark-gaps, across which the current jumps to the heavily-insulated wires leading to the ignition-plugs, and between these high-tension wires are seen the low-tension terminals that are connected by less heavily-insulated wires with the commutator.

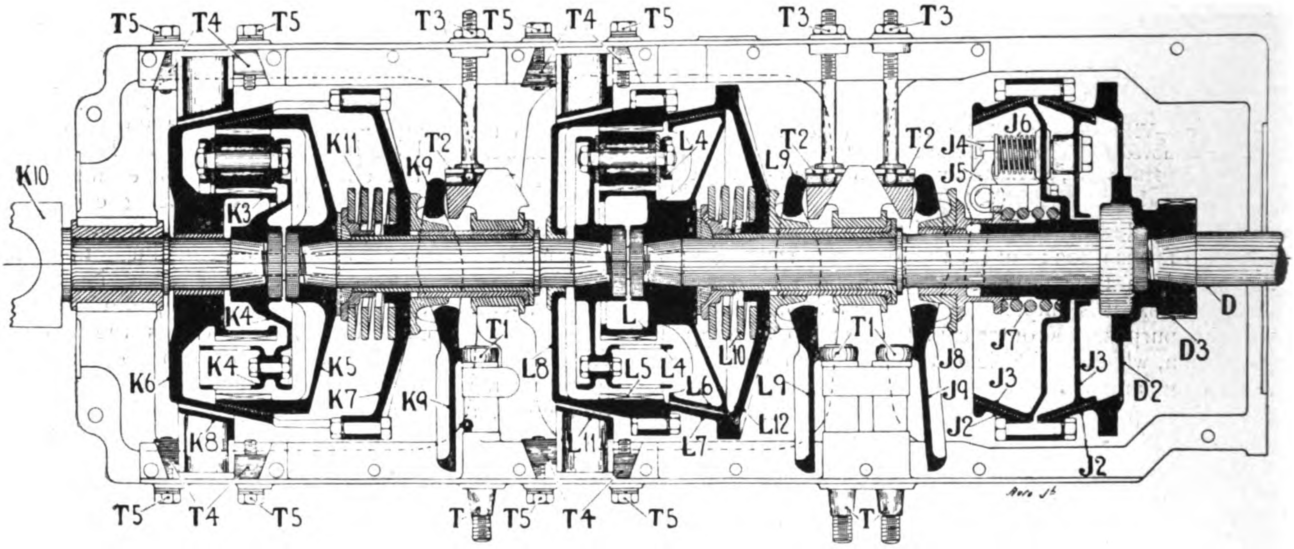


FIG. 11.—Section of the Wilson-Pilcher Main Clutch and Change-speed-gear, which gives four Speeds with two Epicyclic Trains.

The Change-Speed Gear and the Clutch.

Referring to Figs. 8 and 11 it will be seen that the gear-box is rigidly fixed to the crank-chamber, and that it contains three distinct mechanisms, one behind the other, between which there are separate bearings. The mechanism nearest the engine is the main clutch, the central mechanism is an epicyclic gear that is capable of reducing the speed in the ratio of about 2·7 to 1, and the other mechanism is another epicyclic gear that is capable of reducing the speed in the ratio of about 1·7 to 1. Separate short shafts connect each of these mechanisms together, and the whole mechanism forms a direct connecting link between the crank-shaft, D, and the coupling, K^{10}, to which the propeller-shaft driving the live-axle is connected. The clutch is capable of disconnecting the shafts which terminate in it, but normally it couples them together rigidly. Both the epicyclic gears normally act in precisely the same way as the clutch—thus merely forming flywheels on a direct-through shaft—but each can have one of its members held stationary, so that it forms a reducing gear between the shafts leading into it. A particularly interesting feature of this car is that four different speeds are obtained from two epicyclic trains, and this, it will be noticed, is done by arranging them in "series" with one another. Normally, a direct-through-drive is obtained, and then none of the gear-wheels in the gear-box revolve relatively to the through-shaft—this is the fourth speed. If the epicyclic train in the rear of the gear-box is brought into play, then the propeller-shaft makes about ten revolutions for every seventeen of the engine, owing to its speed reducing ratio being about 1·7 to 1 already mentioned—this is the third speed. If, on the other hand, the epicyclic train just behind the clutch is brought into action, the propeller shaft will make about ten revs. for every twenty-seven of the engine, its gear ratio being about 2·7 to 1 as stated above—this gives the second speed. When both epicyclic gears are brought into play at the same time, the shaft between these gears is caused to make ten revolutions for every twenty-seven of the engine, and the speed is still further reduced between this shaft and the propeller-shaft, so that it will make ten revolutions whilst the engine is making about forty-six revolutions—this gives the first speed.

The main clutch—various portions of which are shown separately in Fig. 12—has an outer shell, J^2, which is made in two parts, and is bolted to the flange, D^2, on the end of the crank-shaft, D. The clutch shell, J^2, has two conical friction surfaces formed inside it, and with these engage a couple of male cone members, J^3, that are mounted on the gear-shaft, and are normally forced away from one another by the strong spring, J^7. The internal members of the clutch are carried by three keys on the gear-shaft, and it will be noticed that when they are forced apart by the spring, J^7, no end-thrust can be imposed on either of the shafts because the pressure is balanced. The two portions of the inner member

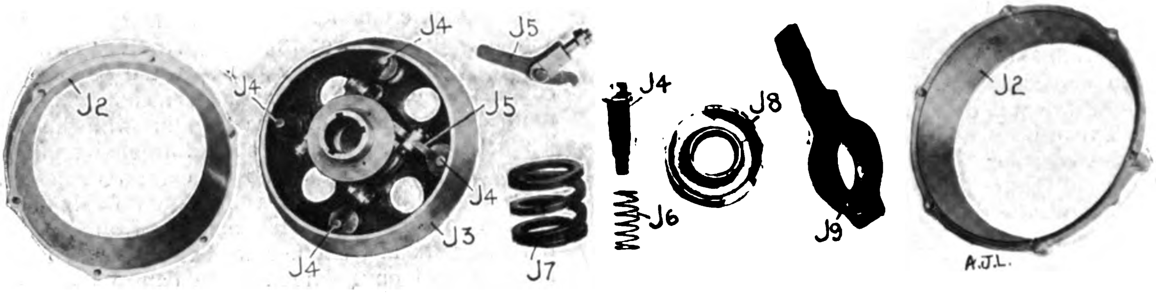


FIG. 12.—Some of the chief parts of the Wilson-Pilcher Double Cone Main Clutch.

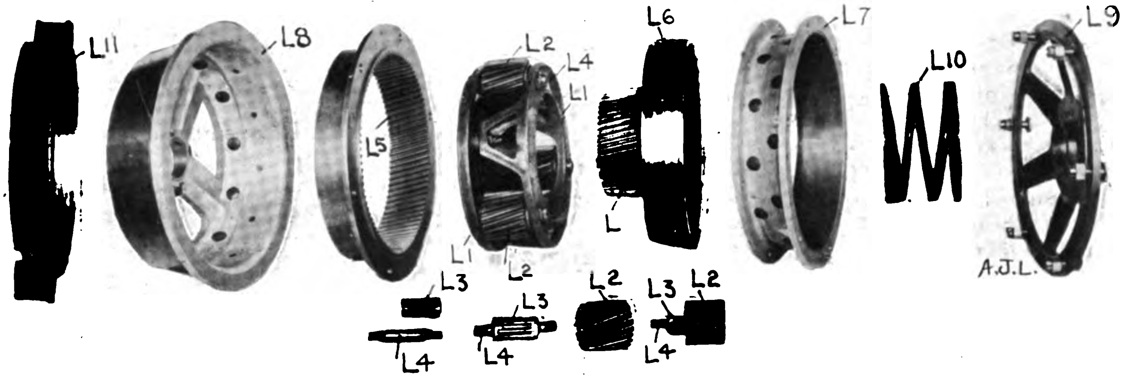


FIG. 13.—The chief parts of the Epicyclic Gear which gives the Second Speed.

are ingeniously connected together by the four levers, J^5, and the four pins, J^4, so that when the thrust-collar, J^8, is slid inwards along the shaft by the lever, J^9, these two portions are drawn together against the action of the spring. The levers, J^5, have small hooks formed at their outer ends, and these engage in notches in the pins, J^4. It should be pointed out that one end of the spring, J^7, presses against the sliding collar that engages with the levers, J^5, and that thus the other end of these levers press the one portion of the clutch towards the engine, whilst their fulcrum pins actually draw the other member in the opposite direction. By this construction one cone member is made to engage with the shell before the other, and thus a very soft clutch action is ensured. Each of the pins, J^4, is fitted with a light compression spring, J^6, to take up any end-play of the pins. The clutch is operated by the lever, J^9, the outer end of which rests in a cavity formed for it in the side of the gear-box, and the other end rests against a block, T^2, that forms a fulcrum for it. The block, T^2, is wedge-

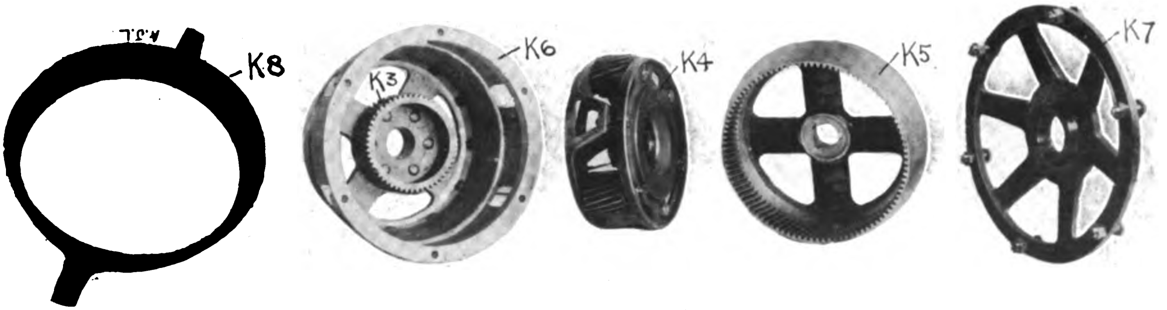


FIG. 14.—Some of the parts of the Epicyclic Gear which gives the Third Speed.

shaped where it fits against a sloping face near the bearing, and it can be forced inwardly, or allowed to move outward, by a bolt, T^3, which passes through the side of the gear-box for this purpose. By sliding the block, T^2, inwards or outwards, the wedge-shaped faces cause it to move towards or away from the clutch, and thus an adjustment is provided for the clutch in such a way that T^2 can be manipulated without taking off the cover of the gear-box. The clutch-pedal is connected with the lever, J^9, through the shaft, T, which is mounted in a bearing in the gear-box. The shaft at its inner end has a crank-pin formed on it, and there is a roller, T^1, on the crank-pin. The roller presses up against the lever, J^9, and, when the shaft, T, is turned about its axis, the lever, J^9, is forced inwards towards the clutch, thereby disengaging it. It will be noticed in Fig. 12 that the lever, J^9, has a rounded-off face, where it fits inside the cup-shaped ring, J^8, and it will be understood that it is the ring, J^8, that acts as the thrust collar when disengaging the clutch.

The two epicyclic gears are arranged in a different way, so as to give the desired speed ratios, but the sizes of the wheels constituting them is identical. In the gear nearest the clutch, the "sun"—or central spur-wheel—L, is driven by the engine, and it is the cage, L^1, carrying the planet-wheels, L^2, that is rigid with the other shaft. In the other gear, the internally-toothed ring, K^5, is driven by the engine, though, again, it is the cage, K^1, that is connected with the propeller-shaft. The various parts of the former gear are shown separately in Fig, 13, and each of these can be easily recognised in Fig. 11. The sun-wheel, L, is fixed to a cone-faced casting, L^6, and to the shaft by which this gear is driven from the clutch. Around the sun is fitted the cage, L^1, and this cage is securely fixed to the shaft that passes rearwardly to the other gear. The cage forms supports at both ends for three pins, L^4, about which the planet-wheels, L^2, are mounted on the roller bearings, L^3. Outside the planets, and also meshing with them, is the internally-toothed gear-ring, L^5, which is securely bolted to an internally-coned casting, L^7, and through it to the casting, L^9. Another casting, L^8, is also bolted to these parts, so that the gear-wheels are completely enclosed in a shell, inside which is the toothed-ring and a cone-face engaging with the cone, L^6. The casting, L^8, also has a cone formed outside it, and the whole shell is free to move a certain distance longitudinally on the shaft. It is mounted freely about the shaft at both ends, so that it could revolve independently, if neither its internal nor its external cone-faces were brought into engagement. The external cone-face is surrounded by a stationary brake-rim, L^{11}, which is fixed to the sides of the gear-box. It will be noticed that when the shell is in its forward position it engages with the cone, L^6, and that it is normally held in this position by the strong spring, L^{10}. It can, however, be forced in the opposite direction, by a precisely similar mechanism to that which operates the clutch, this being done by the lever, L^{12}, which is fitted in the same way as the lever, J^9. When the shell is forced rearwardly it ceases to engage with the cone, L^6, by which it is being forced to revolve solidly with the through-shaft, and it is instead made to engage with the stationary brake ring, L^{11}, which causes it to come to rest. In the former case the gear is rendered entirely inoperative, and in the latter case the power is transmitted through it, and the speed of the car is reduced. There is no end-thrust imposed on either portion of the through-shaft when the gear is inoperative, because the spring is introduced between the castings that form the two members of the clutch that is then in use, and there is no rubbing friction between the sliding thrust-collar and the casting, L^9, when the gear is in use, because both these members are then stationary.

(*To be continued.*)

Mr. J. R. Egerton, of Ipswich, is to be congratulated on the result of his appeal to the Ipswich Quarter Sessions. He had been convicted by the magistrates of driving in a manner dangerous to the public. On the appeal he was able to produce some additional evidence, notably that of the driver of one of the municipal trams which he passed close to on the occasion when he was said to be driving dangerously. This driver had been approached by the police to give evidence on their side, but refused to do so. As a tram driver he was, to some extent, a judge of speed, and the result of his evidence, and the excellent way in which the case for the appellant was handled by Mr. Wild, resulted in the Recorder quashing the conviction. The case presented some amusing features. The principal witness for the prosecution, a policeman, swore that there were people on the footpath, but under cross-examination the "people" diminished into a single person, a variation which drew a reproof from the Recorder, while one of the witnesses—to wit, a butcher—as to speed declared that the automobile passed him at 17 or 18 miles an hour "with the ignition still on." Cross-examined as to what he understood by ignition, he hesitated a good deal, and finally declared he meant by this either the "light" or the "friction," but, on being still further pushed, decided in favour of the latter. The Recorder refused to give costs against the magistrates, though he admitted that against an ordinary respondent he would have done so.

It is with very great regret that we record the death, after a long illness, of Mr. Edmund Macrory, K.C., who was in his 73rd year, and had been for some time past a member of the committee of the A.C.G.B.I.

We had occasion in our last issue to refer to the manner in which motor car mishaps are grossly misreported and exaggerated. We learn from Mr. S. F. Edge that in connection with the accident which occurred near Hastings between a motor car and a waggonette during the Easter holidays, and of which a very alarming account has appeared in the general Press, the whole matter has been, like most other cases, greatly distorted. It would appear that the extent of the damage done to the waggonette, which was reported to have been smashed to pieces, has been settled at under £5, and instead of the occupants of the brake being injured as reported, within two days after the accident all of them were about, doing their usual work in the ordinary way. In regard to the damage done to the Napier car this was quite inconsiderable. In fact it was driven back to London without any difficulty, and returned again a day or two after by road to take the insurance people down to see the extent of the accident. The main cause of the mishap, we learn, was due to the very slippery hill which the car was descending at the time, and to the fact that the waggonette was on the wrong side of the road.

STEERING GEARS FOR MOTOR CARS.

By C. H. Gale, A.M.I.C.E.

THE question of tyre wear is one of the most important that a motorist has to face, and damage causing deflation may mean not only vexatious delay but possibly a serious accident involving loss of life.

A vast amount of ingenuity has been expended on tyres and treads, and the modern high class tyre has been brought up to a very high state of development. It is of very great importance, however, to see that they get fair treatment; that is, that lateral movement of the wheel over the road should be reduced to a minimum. Once a side slip has commenced it is very difficult to stop, and a car whose wheels are not rolling truly (*i.e.*, have lateral movement) is always very liable to side slip, since the initial resistance to side slip is already overcome by the wheels being forced along more or less at an angle to their rolling path.

Thus a properly designed steering gear is an absolute necessity for economy of tyres, and on this point more ignorance seems to be displayed than on any other part of the modern car. Probably not 10 per cent. of the cars now running have even an approximately correct steering gear, and consequently the tyre makers have to suffer and take blame which is not their due.

To insure that there is only rolling action on the tyre of a wheel, when a car is travelling in a curve, the axes of all the wheels must meet in a common point. This means that the outside steering wheel (where the usual two pivot steering gear is used) must be turned through a smaller angle than the inside one, and this is obtained in the Ackerman axle, by the use of bell cranks with arms converging—when the car is running straight—to some point on the longitudinal axis of the car. If the arms of the bell-cranks were parallel, the steering wheel would of course turn through equal angles, and the outside wheels would be converged relatively to its true path.

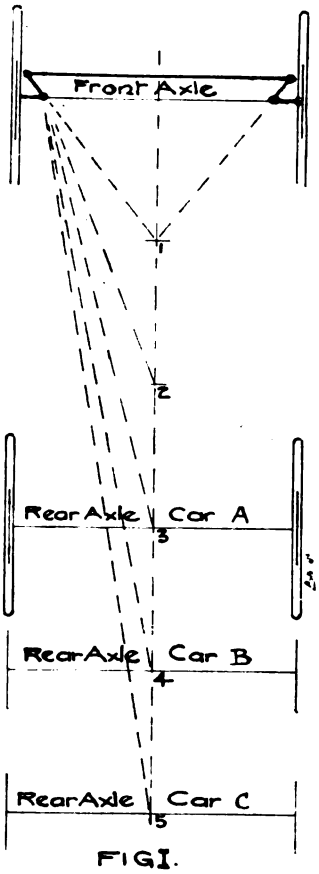


FIG I.

Now, almost everything depends on the amount of the convergence of the bell-crank arms, and it is here that the designers of motor cars go astray. I have gone thoroughly into the question of the effect of shifting the point of convergence of the arms of the bell-cranks, taking three typical cars of different proportions—a short car, a medium car, and a very long car—and have worked out the results shown in two tables, and by curves in Figs. II., III., and IV. These curves were obtained by plotting out the steering gear to a large scale, by moving the inside wheel through the angles 5°, 10°, 15°, &c., up to 50°, and by then measuring the deflections of the outside wheel corresponding to these angles of the inside wheel (*see* Fig. VI. and 1st Table), and by finally taking the difference between these values and the true values—found from the formula (2nd Table)—and plotting the results as shown in Figs. II., III., and IV.

Curves No. 1 in Figs II., III., and IV. were obtained with the arms of the bell-cranks converging to Point 1 (Fig. I.). This point is two-thirds of the wheel base forward of the rear-axle in the case of the short car (A), is three-fourths forward of it in the medium length car (B), and is four-fifths forward in the case of the long car (C). In the same way Curves No. 2 in Figs. II., III., and IV. were obtained with the bell-cranks converging to Point 2 (Fig. I.), and Curves 3, 4, and 5 correspond with the other Points 3, 4, and 5 (Fig. I). The position

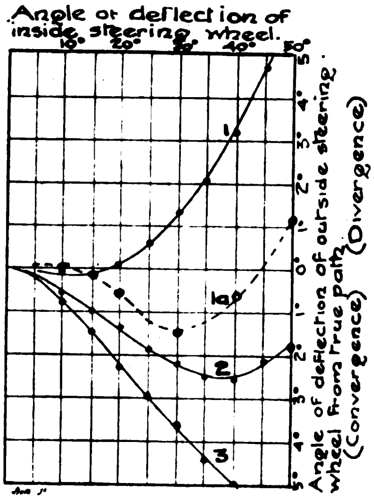


FIG II. CAR A.
Wheel base=1½ times gauge.

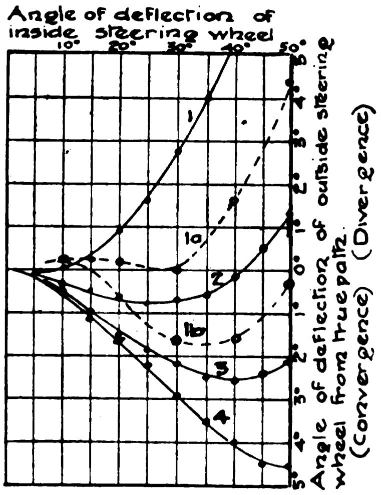


FIG III CAR B.
Wheel base=2 times gauge.

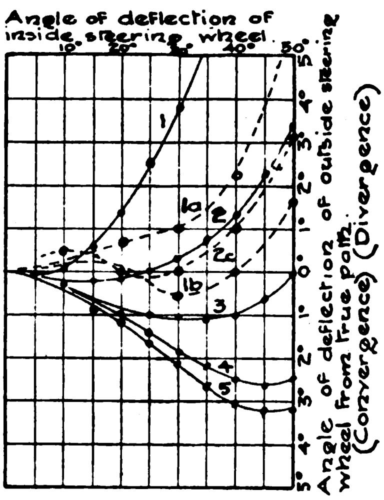


FIG IV CAR C.
Wheel base=2½ times gauge

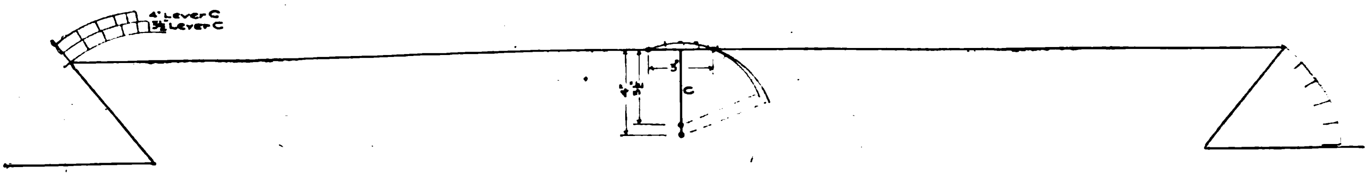


FIG V
Converging point No 1

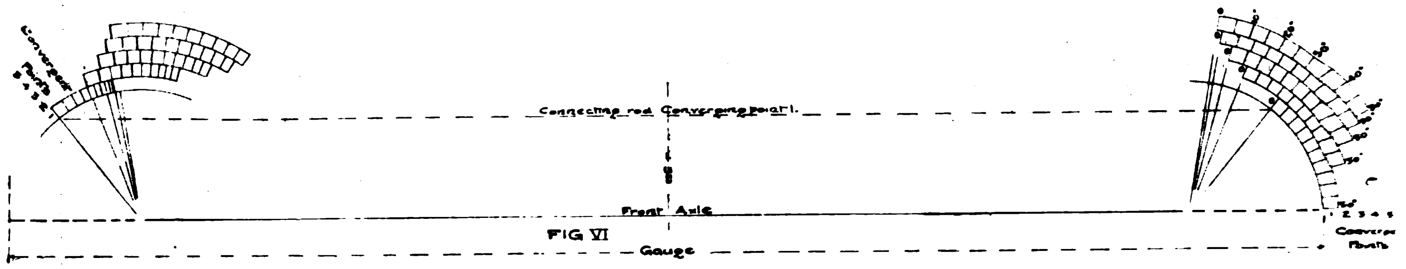


FIG VI

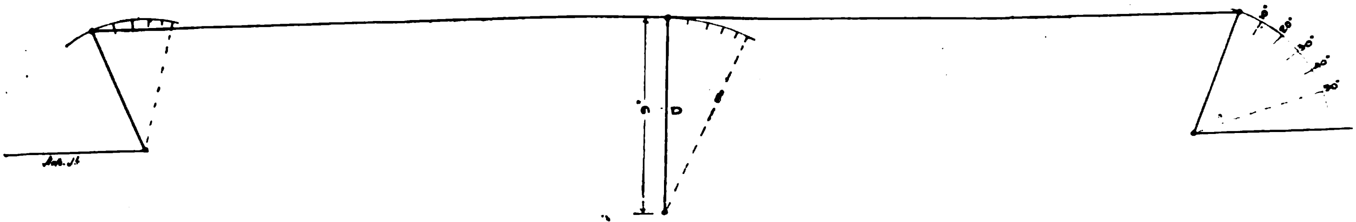


FIG VII
Converging point 2

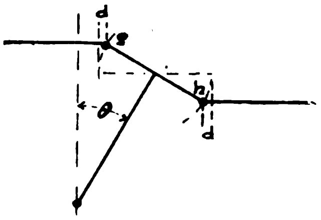


FIG VIII

Angle of deflection of inside wheel	Actual angle of outside wheel for converging points					Correct angle of outside wheel.		
	1	2	3	4	5	Car A	Car B	Car C
0°								
5	4.9°	4.9°	4.9°	4.9°	4.9°	4.7°	4.8°	4.8°
10	9.1	9.6	9.8	9.7	9.6	9.0	9.2	9.3
15	13.0	13.8	14.3	14.5	14.3	12.8	13.3	13.6
20	16.2	17.7	18.6	18.8	18.8	16.3	17.1	17.6
25	19.0	21.5	22.5	22.9	23.2	19.6	20.7	21.5
30	21.3	24.8	26.2	27.0	27.4	22.6	24.1	25.1
35	23.5	28.0	29.9	30.9	31.4	25.5	27.4	28.7
40	25.0	30.8	33.2	34.6	35.2	28.2	30.6	32.1
45	26.4	33.2	36.1	38.2	38.7	31.0	33.7	35.5
50	27.6	35.5	39.0	41.4	42.1	33.7	36.8	38.9

1st TABLE
(Obtained by measurement from FIG VI)

2nd TABLE
Calculated from formula:-
$\cot x = \cot a + \frac{b}{c}$
x = deflection of outside wheel.
a = do inside wheel.
b = gauge of car.
c = wheel base of car

Inside wheel	Outside wheel 4" Lever C	Outside wheel 3½" Lever C
10°	9.0°	9.1°
20	16.9	17.8
30	24.1	25.7
40	28.9	32.2
50	32.5	37.0

3rd TABLE

Referring to Fig. V.

of these other points in relationship to the short car (A), to the medium car (B), and to the long car (C) is clearly shown in Fig I., as, for instance, Point 3 is on the rear-axle of the short car (A), and is two-fifths of the wheel base forward of the rear-axle in the case of the long car (C). I have purposely included a large range both in the positions of the converging point of the bell-crank arms and in the angle of turning of the inside steering wheel.

The curve of a perfect steering gear would, of course, be a straight line along the centre of Figs. II., III., and IV., marked O°; that is, the outer steering wheel would follow its true path relatively to the inner wheel, and the converging point of the curve nearest to that line—within the limit of the maximum angle of turning of the inside steering wheel (generally not more than 35°)—is the proper one to adopt.

Now, from the curves it may be seen that for the short car (A) this point lies between Points 1 and 2 (Fig. I.), and for the long car a little behind Point 2; and as these cars are of extreme proportions, embracing probably all cars now running, we arrive at the fact that, for all cars, *the correct converging point for the arms of the bell-cranks should be between three-fifths of the wheel base forward of the rear-axle for short cars, and midway between the front and rear-axles in the case of very long cars.*

The great majority of cars have the converging point on or about the centre of the rear axle, and a glance at Curve 3, Fig. II., Curve 4, Fig. III., and Curve 5, Fig. IV., which show the result of having the point in this position in the case of the three cars shown in Fig. I., and, remembering the fact that for every degree of deflection of a wheel from its true rolling path the lateral movement of the wheel on the road is equal to 1·74 feet in 100 feet, or 92·14 feet in a mile advance, the wonder is that tyres last as long as they do.

It will also be seen, from the curves, that the Ackermann axle can be strictly correct in two positions only, when the car is running straight, and at some angle dependent on the choice of the converging point of the bell-crank arms. If this point is chosen too far back (say four-tenths of the wheel base forward of the back axle), the gear may never be correct within possible angles of turning, except when the car is running straight (*see* Curves 2 and 3, Fig. II., Curves 3 and 4, Fig. III., and Curves 3, 4, and 5, Fig. IV.) From Figs. II., III., and IV. it can also be seen, in the more correct curves, that for small angles of turning, the steering wheels are too convergent and that for large angles they become rapidly too divergent from their true path. Now this can be to a great extent obviated by the use of a compensating lever, C, Figs. V. and VIII., which I believe is fitted to one make of car. When the compensating lever, Fig. VIII., is thrown over through the angle, θ, in the action of steering, the bars connecting the bell-crank arms with the lever are shortened by the distances, d, d. The steering-wheels are thus made more convergent, and the distances, d, d, become rapidly greater as the angle, θ, increases, the curves in Figs. II., III., and IV. being bent downwards more rapidly at big angles—which is what is required. Taking the cases of the cars with the converging point at 1, Fig. I., the Curves No. 1, Figs. II., III., and IV. become deflected to 1A and 1B when the shank of the lever is respectively of the lengths, 4 inches and 3½ inches, as shown in Fig. V. From which it will be seen that by making the arms of the bell-crank very convergent, to a point, perhaps, three-quarters of the wheel base forward of the rear axle, and making the head of the lever, C, a proper length between g and h (Fig. VIII.), a steering-gear may be designed so that the steering-wheels will not deviate from their true paths by more than a small fraction of a degree. The compensating lever may have little or no head, and may be a simple pivoted bar as D, Fig. VII. The effect of this is shown in Fig. IV., Curve No. 2, which becomes Curve No. 2C.

It must always be kept in mind that the converging point has to be more forward of the car when the compensating lever is used than when the simple bell-cranks are used. That is, a curve must be chosen that is too divergent at large angles, since the effect of the lever is to render the wheels more convergent at the large angles. If the converging point is far back, or if the curve is below the O° line (Figs. II., III., and IV.), such a lever can only increase existing errors. Long bell-crank arms also tend to flatten the curves, but have not much effect on the curves if kept within reasonable dimensions. Arms 18 inches long would make less than half the correction of the lever, C (4 inches long). A double system of bell-cranks can be made to give very correct results, and, I think, are fitted to one make of car, but too much complication in such a vital part of the car as the steering gear is to be avoided if possible. It may be noted that these results may be applied to a forecarriage, as the gauge of the back wheels does not influence the curves.

The steering gear of any car may be tested by taking off the front axle and removing the wheels. The correct angles for the outside wheel can then be calculated from the formula given in the 2nd Table, and the actual movements of the outside wheel relatively to the inside wheel may be found by turning the inside wheel axis through known angles, and measuring the corresponding angles of the outside wheel axis.

In a six-wheel car, having all the four front wheels similarly pivoted for steering, the correct position of the wheels relatively to each other may be found from the following formula :—

If a = angle of inside front steering wheel,
u = angle of outside front steering wheel,
y = angle of inside back steering wheel,
z = angle of outside back steering wheel,
b = gauge of car,
c = wheel base of car.
d = distance between the two steering axles,

$$\text{Then } \cot. u = \cot. a + \frac{b}{c}.$$

$$\cot. y = \cot. a \frac{c}{c-d}.$$

$$\cot. z = \left(\cot. a + \frac{b}{c}\right)\frac{c}{c-d}.$$

Since writing the above article, I have had an opportunity of seeing the Crystal Palace Show, and an inspection revealed the fact that a great many of the cars had the bell-crank arms parallel or nearly so, and that no less than three cars and one forecarriage had the arms converging to a point *in front of the forward axle*. The case of these cars is indeed bad, and the errors are greater than the worst case shown in my article.

AN automobile 'bus service has been commenced from Lecco to Introbbio, in Italy. One omnibus is in daily service and traverses the 104 kilometres of the return journey at an average speed of 13 kiloms. per hour, which, as the district is mountainous and involves a rise of 615 metres, is a fair performance for a large 'bus. The 'bus, which has been built by the Union Company, of Nürnberg, is provided with a 12-h.p. single-cylinder motor, the friction speed gear usually built by this company being fitted and the transmission being by a single chain. A second 'bus is being kept in reserve, presumably in case of breakdowns and also for the purpose of grappling with extra traffic during the busy season.

"A 4761" is the official number which has been allotted this week to Prince Henry of Prussia's motor car during his brief visit to England.

MESSRS. TILLING, the large and very successful omnibus proprietors, are reported to have taken up the question of motor omnibuses in a very energetic spirit. A specimen omnibus which they have submitted to the authorities of Scotland Yard has met with their approval, and by way of preliminary Messrs. Tilling propose exploiting their first vehicle at Eastbourne, with the subsequent intention of substituting, if found practicable, motor driven vehicles for several of their horse-drawn omnibuses. During the past week they have been experimenting in the London district.

REVIEWS OF BOOKS.

"My Airships; the Story of My Life." By A. Santos-Dumont. London: Grant Richards.

> "In 1901 M. Santos-Dumont carried out some more or less successful experiments with a dirigible balloon in Paris."

Everyone who has followed, even in the daily Press, the record of Santos-Dumont's experiments, and more particularly if they have taken note of the record which has appeared in this Journal, will have been impressed with the singular inadequacy of the above-quoted testimony to what he has done, which forms the sole reference to his operations contained in the "Encyclopædia Britannica" article on aeronautics. Even those who have followed M. Santos-Dumont's proceedings with some care are very likely to have formed a quite inadequate estimate of what he has really accomplished. Why this should be so it is perhaps a little difficult to say, but it is probably due to the fact that the daily Press has chronicled at full length the accidents that have happened to his airships, while it has devoted much less space to the very remarkable record of his numerous successes. It was important, therefore, that we should have a record from M. Dumont's own point of view of his long series of experiments, and this we have in the present work. The book is well calculated to give everyone who reads it a higher opinion of the author's exploits and an extremely pleasant impression of him, both as a man and a writer. For the first time all the facts relating to the various experiments which this really great and intrepid aeronaut has conducted are put fully and impartially before the public.

And the book is fascinatingly written. Dumont's life story is the story of attempting to solve the problem of aerial navigation, and his writing consequently has the verve and grit which is nearly always characteristic of the writing of a man who is master of his subject and is willing to tell us his experiences without circumlocution.

As a boy he dreamed about it. As a man he has gone far towards realising it. What emerges from these memoirs—for memoirs after all is what the book mainly consists of—is the much greater practical experience M. Dumont possesses than it has been usually the custom to credit him with. Long before he attempted a navigable airship he was an expert balloonist, and had exciting experiences as a sort of general representative of M. Lachambre in various parts of France. The experience thus gained was, of course, invaluable. M. Dumont himself regards it as indispensable for anyone who wishes to experiment with dirigible balloons, and his remarks on the accident that happened to M. Severo make it clear that this appalling catastrophe was in all probability not due, as was supposed at the time, to the ignition of gas by the motor, but was more likely a "cold explosion" caused by the extreme rapidity with which the inexperienced aeronauts allowed the airship to mount to an enormous altitude in a few seconds.

In spite of the many accidents which are fully and faithfully recorded in the present volume, the general success of M. Dumont's experiments emerges with much convincingness. It becomes clear that both in the neighbourhood of Paris, and over the Bay of Monaco, he made a much larger number of successful flights than the public is generally aware of, while at the latter place he navigated against very considerable winds indeed. The accident which there brought his experiments to a conclusion was in the main due to the balloon-house not being provided with a proper starting and landing platform in front of it. The necessity for various requirements of this kind can only be fully realised after extended experience.

The work is throughout written with all the charm which only the real personal narrative can, as a rule, possess. Even the casual reader who knows little about airship construction will probably find it impossible to put it down unfinished. For the student of aeronautics the interest is bound to be absorbing.

The author passes with a light touch over the unpleasant incident of the opposition to awarding him the Deutsch prize on the part of some of the members of the Aero Club. All he observes is that

> "For a while indeed it seemed that it might be more difficult to have the prize awarded to me than it had been to win it."

This is indeed treating the subject with considerable generosity.

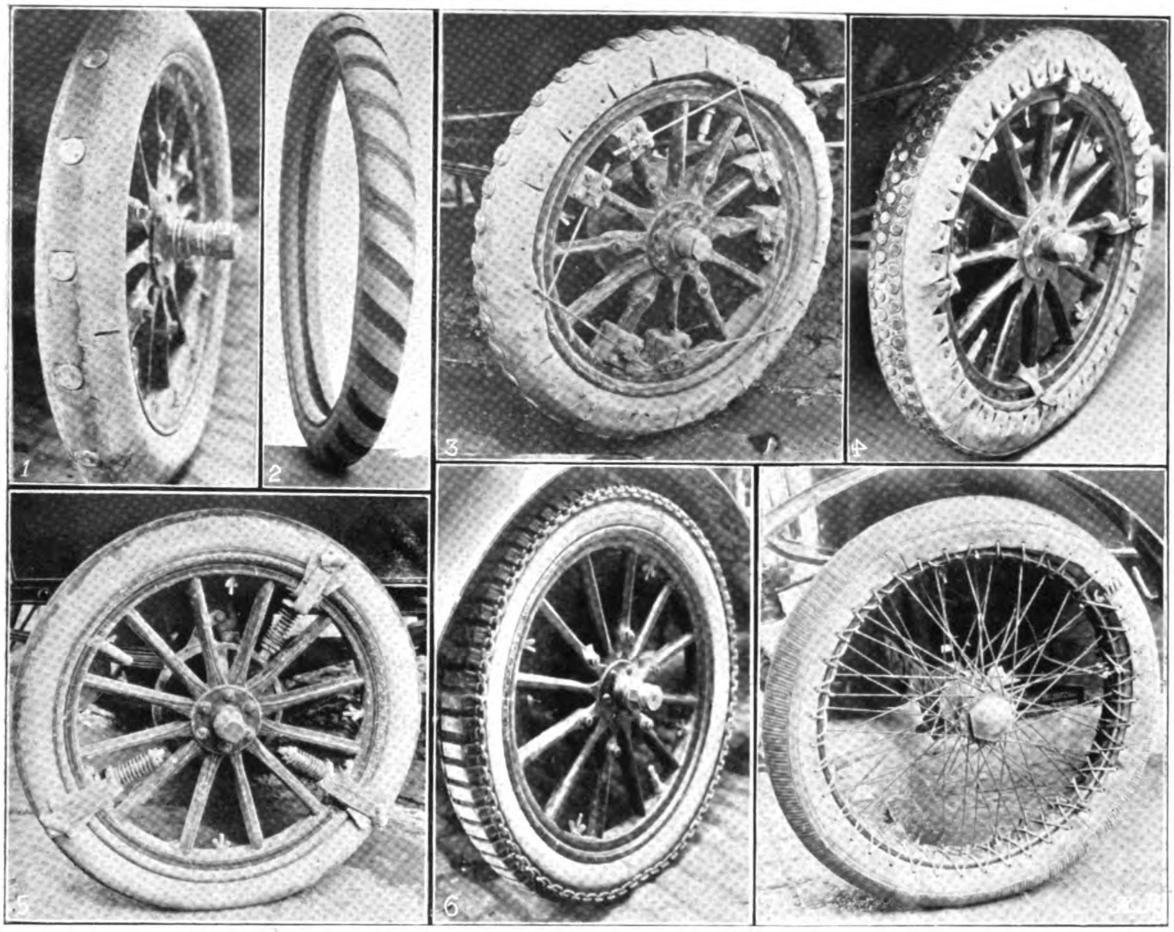
The work is full of hints for practical aeronauts. Perhaps its most important lesson is the emphasis it lays on the necessity of previous experience with ordinary spherical balloons. Very interesting, too, are the observations made in regard to the value of the guide-rope for maintaining a constant height when "airshipping" over water, and the proof that the danger dirigible balloons incur at high speed is not that of having their "heads blown in" but of having their "tails blown out." Nor can it fail to give rise to some reflection that several of the worst accidents which M. Dumont has experienced were due to the unexpected stopping or irregular action of his petrol motor.

If the book as a whole has a fault, it consists in somewhat overrating the importance of navigable balloon experiments to the whole question of aeronautics. M. Dumont writes throughout as if the airship problem were absolutely solved. This is perhaps natural in the case of a successful and enthusiastic experimenter. But, surely, M. Dumont in his own calmer moments must recognise that even his No. 8 is separated from a practical commercial airship by at least as big a chasm as that which intervened between the Cugnot steam carriage of 1770 and the modern everyday automobile.

"The Law Relating to Motor Cars." By H. L. Lewis and W. H. Porter. Third Edition. London: Butterworth and Co. and Shaw and Sons. *2s. 6d.* net.

The third edition of this handy little work has been brought up to date by the inclusion of the regulations of the Local Government Board for the use and construction of motor cars issued under the new Act. The notes to the text of the Act have also been somewhat expanded, while the introduction has been considerably amplified, and is now very complete, a perusal of which will give the automobilist a general idea of the provisions of the Act, of what is required of him, and of the various duties he is to perform as owner of a motor vehicle. The index also has been made very complete, and altogether the little work has been rendered more valuable from every point of view.

SIDE-SLIP TRIALS OF THE A.C.G.B.I.



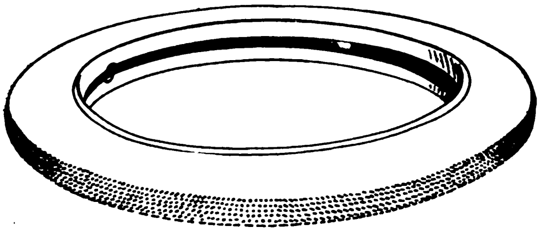
ANTI-SKID TRIALS OF THE A.C.G.B.I.—Some of the competing devices. (1) The Butler, (2) The Vivian, (3) The Edwards, (4) The Billet, (5) Sainsbury's Anti-Skidders, (6) L'Empereur, (7) The Crown.

Commencing on Monday, the side slip competition organised by the A.C.G.B.I. has been steadily progressing throughout the week. On the first day the endurance test commenced, when 11 devices, out of 16 entered, fitted to cars, took part in the run to Margate and back, the start being from the Club Down Street Garage, the cars returning on the same day to the Locomobile Garage, South Kensington. Besides the 11 starters there are 3 devices consisting of discs which are let down from the driver's seat when required to be brought into action. These, by special resolution of the Organising Committee, will only run on Monday next for a distance of about 100 miles. On Tuesday the destination of the cars was Marlborough, Wednesday to Slough, Beaconsfield, and back, the same round being repeated twice during the day. The return on each evening was to the Locomobile Garage. During this latter run of 104 miles no less than 48 miles of tramlines had to be passed over, rendering the test a very severe one for the claims of the non-skidding devices. On Thursday the run was to Birmingham, the next day from Birmingham to Nottingham, and on Saturday (to-day) the cars were due to return to London. On Monday next, the last day of the endurance portion of the trials, there will be a repetition of the run to Slough, Beaconsfield, and back, twice, taking the 48 miles of tramlines again. On that day the emergency devices of Mr. Cavendish, Mr. Hunt, and Messrs. Rourke and Horsborough are due to participate. Resiliency and absorption of power tests will proceed next week, and the "slipping" tests will be held at the new Talbot works on May 7, when Thames mud will be employed. The following is a brief summary of the character of the devices taking part in the endurance trials, of most of which we also give explanatory illustrations. With the exception of the Wilkinson, Vivian, and Butler, the competing devices are all detachable. The special mechanical devices adapted for occasional use will be dealt with next week.

The Edwards non-skidding band consists of a chrome leather tread which is held in place by eight flexible wires (four on either side of the wheel), which are threaded through the hollow beading. The ends of each wire are secured to clamps fixed to the spokes, as shown in our illustration (No. 3). Steel strips are riveted transversely to the tread in order to prevent both slipping and skidding.

The Vivian non-skidding tyre relies on a special vulcanising process for producing a tread which shall give immunity from side slip. The tread is so made that alternate strips of hard and soft rubber are formed diagonally across it. Side slip is said to be prevented by the relative depression of the softer rubber under running condition, which thus leaves the harder strip standing out diagonally across the tyre. In our illustration (No. 2) the darker bands are the harder rubber.

The Wilkinson non-skidding tread, which we described in connection with the Crystal Palace Show in our issue of March 5th, 1904, p. 289, consists, as our readers are aware, of a wire brush formation of tread. The bristles, however, instead of pointing vertically outwards are externally sloped slightly with the direction of the drive, so that the load tends to produce a bending moment in the wire staples, and causes them to give a better cushioning action than if their ends were directed against the drive and took the stress end on.

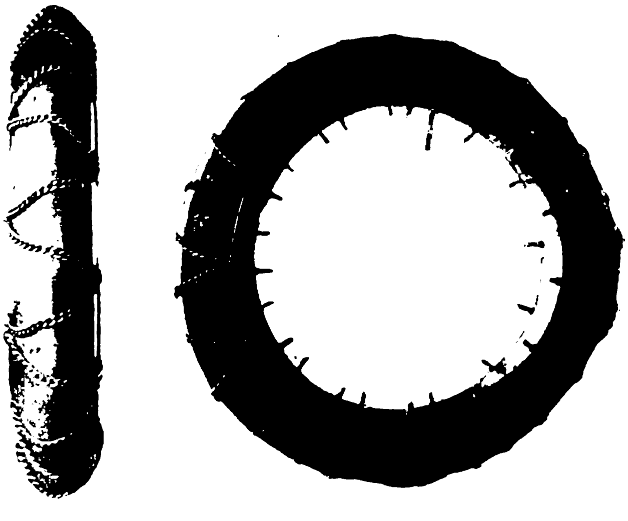

The Wilkinson Wire Tread.

W. Jenkinson and Co. have entered the "Crown" tyre cover, which consists of narrow transverse strips of solid leather threaded on wires to form a complete cover to the tyre. The ends of the strips are joined to a common strap on each side, and the device is retained on the tyre by lacing under the felloe. The strips of leather are so arranged as to present a rough surface on the tread. This device is represented in our illustration (No. 7).

Sainsbury's anti-skidders are separate devices attached to the felloe, three being fitted to each of the rear wheels. Each attachment consists of a steel fork, the prongs of which project outwards on either side of the tyre, from which they are protected by small leather pads. The forks are held outwards by a helical spring, and are adjusted so as to just come in contact with the ground when in their lower vertical position. To deaden any noise which might be caused by the steel forks coming suddenly in contact with the ground, small rubber tips, clearly shown in our illustration (No. 5), are fixed to them in a slanting position, so that while they take the first shock of contact; they are not sufficiently stiff to invalidate the efficiency of the steel forks as a means of preventing side slip of the tyre.

The L'Empereur non-skids are entirely of metal, and are composed of flat transverse strips placed across the tread and linked together at the ends to form an endless band, as shown in our illustration (No. 6). The device is sprung in position before the tyre is fully inflated, and the pressure of inflation is the means used for retaining it in place, the transverse plates being bent inwards at their ends to facilitate this.

The Parsons non-skid chains are also taking part in the trials, but these are too well-known to need further description to that which we gave in our issue of January 10th, 1903, p. 42.


The Parsons Non-Skid Chains.

The Civil Service Cycle Agency have entered the "Billet" leather cover, the tread of which is furnished with a triple row of steel studs. The chrome leather cover is adjusted in place by steel wires threaded through the hollow beading. On the outside, the wire is endless, but on the inside it has a screw fastening which enables it to be drawn tight on to the tyre. In addition, there are four straps, which are used to secure the cover to the spokes, as seen in our illustration (No. 4).

The Butler non-skidding tyre has only a single row of large steel studs, and these, as will be seen from our illustration (No. 1), are let into shallow recesses cut in the tread.

On the first day's run, the Butler device sustained a puncture which prevented it from taking part in the second day's trials. During the run to Marlborough, the car on which the Vivian non-skid tyres were fitted broke her crank shaft, the repair of which was not finished until 1.30 a.m. on the following day, after which the route was completed. The car, however, again went out on Wednesday for the run to Slough. On this day, when the 48 miles of tram-lines were included, one of the Parsons chains gave out, whilst the Edwards device was withdrawn from the trial.

RACES, RECORDS, AND TRIALS.

Mr. Cecil Edge is arranging for an endurance run of 2,000 miles, if possible, without a stop, or, to be strictly accurate, to run 2,000 miles at legal speed in 100 consecutive hours, with a 15-h.p Napier touring car. The test will be one of endurance for the car, but to a still greater extent for the two drivers, who will be Mr. Cecil Edge and Mr. E. H. Arnott, as they intend to drive turn about the whole time, which will mean 100 hours continuously on the car, all provisions and stores being carried on it, as there are to be no stops for sleep or refreshment by the way. Presumably while one of the two is driving, the other will be mostly asleep. The route to be taken will be from London to Land's End, thence to John o' Groats, from John o' Groats to London, and from London the balance of the 2,000 miles will be made up by a run to one of the leading South Coast resorts and back to the starting point. If successfully carried through, the tour will provide a splendid demonstration of the reliability of the Napier vehicle, though that, particularly after Mr. Glidden's Arctic excursion of last year, is hardly now needed.

Baron de Caters, with a 90-h.p. Mercedes on the new Ostend Road, contemplates making a determined effort to lower the kilometre record time recently put up by Rigolly.

Twenty-two cars were entered for the Nice-Rome competition organised by *La France Automobile* to follow the Monaco festivities recently concluded. After the weighing and other formalities on Sunday last, the trials commenced with a consumption trial on Monday between Nice, Sospel, Mentone, and back to Nice *viâ* La Turbie, two hill climbs on the Braus and on the Castillon Passes, and brake tests on the steep descent from the Sospel Pass. On Tuesday steering tests were the feature of the programme, and on Wednesday the endurance test commenced, the stages being:—Turin, 212 kiloms.; Milan, 145; Bologna, 220; Florence, 135; Perouse, 168; Rome, 180. The minimum and maximum speeds recognised are 18 and 24 kiloms. per hour respectively.

GLASGOW TO LONDON RELIABILITY TRIALS FOR TOURING CARS.

List of Entries.

Description of Car.	Starting Order Number.	Name.	Address.
I.—Class A.			
6-h.p. Vauxhall	8	P. C. Kidner	Wandsworth Road, London.
6½-h.p. Cadillac	21	Anglo-American Motor Car Co., Ltd.	19, Heddon Street, Regent Street, London.
6-h.p. Light Wolseley	26	Rennie and Prosser, Ltd.	Mitchell Street, Glasgow.
II.—Class B.			
12-h.p. Gladiator	2	Thomas Shaw, Ltd.	32, Reform Street, Dundee.
10-h.p. Argyll	4	Hozier Engineering Co., Ltd.	Bridgeton, Glasgow.
10-h.p. Ryknield	7	Ryknield Engine Co., Ltd.	Burton-on-Trent.
12-h.p. Richardson	9	J. R. Richardson and Co., Ltd.	Lincoln.
12-h.p. Eagle Light	12	Eagle Engineering and Motor Co., Ltd.	Altrincham.
12-h.p. Arrol-Johnston	13	Mo-Car Syndicate, Ltd.	Paisley.
12-h.p Siddeley	17	Siddeley Autocar Co.	79, York Street, Westminster, London.
12-h.p. De Dion	22	J. W. Stocks	10, Great Marlborough St., Regent St., London.
16-h.p. Maxim	24	The London General Automobile Co., Ltd.	Maxim Works, Gillingham Street, Westminster.
6-h.p. Crouan	28	F. W. H. Garner	286, Croxted Road, Herne Hill.
8½-h.p. Humber	29	Humber, Ltd.	Beeston, Notts.
III.—Class C.			
16-h.p. Sunbeam	1	John Marston, Ltd	Blakenhall, Wolverhampton.
14-h.p. Renault 1904	3	Roadway Autocar Co., Ltd.	19, Newman Street, Oxford Street, London.
12-h.p. Argyll	5	Hozier Engineering Co., Ltd.	Bridgeton, Glasgow.
16-h.p. Argyll	6	Hozier Engineering Co., Ltd.	Bridgeton, Glasgow.
16–20-h.p. Martini	10	H. H. P. Deasy and Co., Ltd.	217, Piccadilly, London.
24-h.p. Eagle Light	11	Eagle Engineering and Motor Co., Ltd.	Altrincham.
12-h.p. Sunbeam	14	John Marston, Ltd.	Blakenhall, Wolverhampton.
12-h.p. Pipe	15	London Motor Garage Co., Ltd.	33, Wardour Street, London.
16-h.p. Rochet-Schneider	16	Morgan Donne	27, St. John's Square, Clerkenwell, London.
20-h.p. Spyker	18	J. W. Broadhead	The Hollies, Elland.
16-h.p. Delahaye	19	Saxon Motor Co., Ltd.	175, Piccadilly, London.
18-h.p. James and Browne	20	James and Browne, Ltd.	395, Oxford Street, London.
18-h.p. Baudouin-Dechamps	23	J. J. Leonard and Co.	Brockeley Garage, Crofton Park, London.
20-h.p. Thornycroft	25	Thornycroft Steam Wagon Co., Ltd.	Chiswick, London.
18-h.p. Siddeley	27	Rennie and Prosser, Ltd.	Mitchell Street, Glasgow.

The entries received for this event up till the last date at single fees number twenty-nine, a total which compares favourably with twenty-five last year. The comparison is, however, more favourable than the numbers suggest. Last year only fifteen makes of cars were entered, duplicate types of several makes having taken part in the run, but the rules of this year's contest provide for only one entry of each type being received, and this rule, while militating against an increased total, has not retarded the increase of makes, of which twenty-four are included in the total mentioned. The firms having more than a single car entered are the Argyll (three), and the Siddeley, the Eagle and the Sunbeam, two each. A curious paucity of small, single-cylinder, two-seated cars is observable. A number of other entries could not be received, not being in conformity with the rules and conditions, a circumstance which the committee much regret. The trial takes place on May 19 and 20, and is organised by the Scottish Automobile Club (Western Section).

A Sports Week is to be organised by the A.C. Bordelais, which will comprise competitions for cars, motor boats, and aeronautical devices.

The American Automobile Association have now under careful consideration whether the big Cup offered by W. K. Vanderbilt, jun., and to be run for, in all probability, on Long Island, shall be open to the whole world, or confined to American cars. In any case this long distance road race will take place during July.

A.C. of America Commercial Vehicle Trials.—Eighteen entries were received for this contest, which started in New York on April 4th, and lasted until April 9th. During the week the various competing vehicles were employed under the ordinary normal conditions of delivery by two large firms, viz., the American and Westcott Express Company, a firm of delivery agents, and the H. Clausen and Son Brewery. The latter firm had the two heavy vehicles assigned to their work, whilst the other fifteen starters, including six electrics, were employed in delivering a variety of goods for the Express Company. There was only one absentee from the entered cars. Each vehicle was provided with a distance-recording instrument. Sixteen different "rounds" were selected, varying from 3¼ to 30 miles in extent, each vehicle during the week covering at least six of these, according to their class. The short trips were, of course, covered several times to make up a minimum daily mileage. Difficulties arose each day in connection with the recharging arrangements of the electric vehicles. In one case No. 15, a big electric wagon, had to be towed eight miles to recharge. On the second day, the Commercial Automobile Company's 25-h.p. steam truck (No. 18), which was carrying loads of beer barrels, withdrew after travelling to Yonkers on the Monday, and returning to New York the next day. The Carlson car (No. 10) also disappeared on this day.

On the opening day, an unforeseen difficulty had to be made the best of. Not knowing what the available carrying capacity of each van was, the loads assigned by the Express Company to individual cars had to be considerably varied, and, in many cases, reduced beyond their maximum carrying powers, as the bulk of the goods to be handled greatly exceeded the accommodation provided, a fault which surely it should have been easy to guard against. Quite half the vehicles were found wanting in this respect. The rules should specify, as in France, not only the dead load to be carried, but also the floor area and the cubic capacity of each enclosed van. No doubt in future trials this defect will be remedied. The starters comprised:—Class 1 (1,000 lbs. load), one Knox and two Oldsmobiles; Class 2 (1,000 to 2,000 lbs.), one Knox, two Popes (electric), one Canton; Class 3 (2,000 to 3,000 lbs.), one Rockliff, one Knox, one Consolidated, one Carlson, and two electrics, viz., one Lansden and one Electric V. Company; Class 4 (3,000 to 4,000 lbs.), one Union; Class 5 (4,000 to 5,000 lbs.), one Electric V. Company; Class 8 (8,000 to 10,000 lbs.), one Fischer (petrol-electric), and one Commercial Company (steam).

We shall publish the official results as soon as available.

NEW classifications for racing automobiles and motor boats were drawn up by the American Automobile Association on the same evening that it was determined to amalgamate with the American Motor League. The classification of cars is for the future to be by weight, as follows:—

1. Cars weighing from 650 to 1,000 kilogs. (1,433 to 2,204·62 lbs.).
2. Cars weighing from 400 to 650 kilogs. (881·84 to 1,433 lbs.).
3. Cars weighing from 250 to 400 kilogs. (551·15 to 881·84 lbs.).
4. Cars weighing from 50 to 250 kilogs. (110·23 to 551·55 lbs.).

Vehicles in Classes 1 and 2 must carry at least two passengers, side by side, of a minimum weight of 60 kilogs. per passenger; 7 kilogs. will be allowed for magneto ignition apparatus. In track racing, for record making, one person only may occupy two-seated cars, but in races on roads the carrying of two passengers will be enforced. The Racing Committee also determined to take charge of the high-powered racing motor boats. New rules, which had been drawn up by the Motor Boat Committee, were adopted, and, amongst other things, these require the registration of all automobile boats racing under A.A.A. rules.

Monaco Motor Boat Meeting.—No time has been lost by the organisers of this very successful series of events, which we so fully dealt with in our last issue, in deciding upon the programme on broad lines for next year's meeting. Speaking generally, the principles governing the meeting will be the same as that just closed, and the dates selected as follows:—April 2nd–5th, the Motor Boat Exhibition, at which, as this year, all boats intended to take part in the subsequent races must be exhibited. From April 4th to 9th the boats will be free to make whatever trials they like on the sea in the neighbourhood of Monaco. The racing programme will commence on April 9th, terminating on the following Sunday, April 16th, with the Speed Mile. The innovations will consist in a special class being reserved for boats using as fuel heavy oil, pure alcohol, or any other fuel less inflammable than petrol. The hexagonal course will be replaced by a course in the form of a parallelogram of the same dimensions, viz., 12½ kiloms.

THE prizes gained this year by the speediest boats amount to considerable sums. Tréfle à Quatre takes about £800, Lutèce £400, Peugeot £350, Princesse Elizabeth £330, and Râpée III. £260.

THE distance for the first handicap race of the motor boats appearing in our table last week, at the top of

NICE AUTOMOBILE WEEK.—In the Neighbourhood of Nice. The Roads of Villefranche.

page 461, should be 50 kiloms. instead of 100 kiloms., as stated, the 100 kiloms. referring only to the second handicap of the racers, which appears in the same table. We point this out as, although the correct distance of 50 kiloms. was referred to in the text, it might lead to confusion with any reader who may not have noticed this fact.

The Coupe Meyan.—On Sunday last this cup was secured at Nice by the 12-metre cruiser, Vas-y, which was also successful during the Monaco Motor Boat Week. The cup was open to motor boats not exceeding 12 metres in length, the distance being 100 kilometres starting from Nice to Antibes and back, thence to Monte Carlo and return. Eight entries were received, but only two boats started, viz., Vas-y and France; the latter, soon after the start, abandoning the race. The winner's time was 3 hrs. 55 mins. 40 secs.

Mr. Robert Todd has been elected chairman of the committee of the Auto Cycle Club for the year, Mr. G. F. Sharpe vice-chairman, and Mr. C. A. Smith hon. treasurer.

The Auto Cycle Hill-Climbing Competition, open to members of the club only, will take place on May 14th on a hill the locality of which will not be made known until just before the day.

Machines will be divided into the following classes:—

(1) Machines with engines having a cylinder capacity of 70 by 70, or the equivalent volume swept out.
(2) Machines with engines having a cylinder capacity of 76 by 76, or the equivalent volume swept out.
(3) Machines with engines having a cylinder capacity of 80 by 80, or the equivalent volume swept out.
(4) Machines with fore-carriages, side-carriages, and trailers, carrying two passengers.

The machines must be standard touring machines, fully equipped for the road, it being left to the discretion of the judges and committee to disqualify any machine which they consider does not come under the head of a touring machine.

No pedalling will be allowed, and should no rider reach the top of the hill in either of the classes, the medal will be awarded to the rider who travels farthest without pedalling, should the judges consider the performance worthy.

The entrance fee will be 5*s.* in each class.

Two silver medals will be awarded in each class, and a gold medal for the most meritorious performance.

The date for the annual reliability trials for motor cycles, organised by the Auto Cycle Club, has been provisionally fixed for June 27th to July 2nd. This year's trials will probably take the form of a 100 miles' run each day for five days, every yard of which will be "observed." These 500 miles will be followed by a hill climb on the Saturday.

Following an objection lodged by Lamberjack against Tamagni, who was adjudged the winner of the motor bicycle cup for the speed mile at Nice, in 1 min. 7⅖ secs., and reported by us on April 9th, page 426, the Racing Committee have held the objection good, as Tamagni was allowed to start a second time owing to some misunderstanding as to the rules. Although Tamagni's time for the standing mile will remain as the record for motor bicycles, Lamberjack has been adjudged the winner of the 1st prize.

During June the Moto Club of Marseilles are organising a novel competition for motor cyclists. The conditions are that each competitor will receive instructions in an envelope at starting for fetching a letter from a certain post office, and return with this to the starting point. There will be no distinction in regard to categories, the first home being the sole condition constituting the winner.

CLUB DOINGS.

Meet of the Derby, Nottingham, and Leicester Clubs at Ashby-de-la-Zouch on April 9th. The meeting was referred to in our issue of April 16th.

Dorset Automobile Club.—At a meeting held at Dorchester last week it was determined to form an automobile club for the county. The meeting was presided over by the Hon. Wilfrid Cairns, and by way of a commencement both Lord Ilchester and Lord Wimborne have signified their adhesion to the new club, which it is proposed should be affiliated to the Motor Union.

Irish Automobile Club.—The annual tour of the club this year will occupy nine days and start about the end of July. The first day's run will be to Killarney. The intention is not to make a labour of the tour, but rather to render it a pleasant holiday. Therefore considerable time will be allowed at points of interest such as Killarney, Derrymane, Waterville, &c., where boating will be indulged in. Some of the most picturesque spots in Ireland will be visited, and the fixture should prove one sufficient to attract the majority of the members of the club to join. Other fixtures during the year include outings on April 23rd, to Bray, Newrathbridge; 30th, Featherbed, Glencree, Enniskerry; May 14th, hill climb; May 20-23rd, tour to Killaloe; June 7th, Rathcoole, Kill; 18th, Blessington and Poulaphouca; 29th, round Howth Head to Malahide; July 9th, Rathcoole, Straffan, Lucan, Phœnix Park.

Lincolnshire Automobile Club Annual Dinner. — The annual dinner in connection with this club, held at the Saracen's Head Hotel, Lincoln, on Saturday night, was a brilliant function, and motorists were present from all parts of the county. The chair was taken by Sir Hickman Bacon, Bart., and there were also present the Mayor of Lincoln, Mr. C. H. Seeley, M.P., Mr. C. Algernon Moreing (Unionist candidate for the Gainsborough division), Mr. H. M. Proctor (chairman of the Holland County Council), Mr. A. W. Dougall (hon. sec. of the Yorkshire A.C.), Major J. S. Ruston, Captain J. A. Cole (chairman of the administrative committee of the Lincolnshire A.C.), the chief constable of Lincolnshire (Captain Mitchell-Innes), Captain Newsum, Mr. Ross Brown (Notts A.C.), Mr. J. R. Richardson, Mr. C. W. Pennell, Mr. W. R. Pennell, Dr. Godfrey Lowe, and others.

After the loyal toasts had been duly honoured, the chairman proposed "The Houses of Parliament," to which Mr. C. H. Seeley, M.P., responded. Mr. J. D. Sandars, D.L., J.P., submitted the toast of the "City and County Magistrates," and the Mayor of Lincoln (Alderman M. H. Footman) replied. Mr. C. Algernon Moreing proposed "The Club," and said the Lincolnshire Automobile Club, in which he was to be enrolled a member, had always been the most distinguished of the provincial clubs in England. It was remarkable in such a horse-breeding county as Lincoln that the people should be on such good terms with automobilists, and it was one of the counties where no requests had been made for roads to be scheduled. He was shortly coming down to live in that great county, and he hoped the club would honour him on some occasion in the summer by having one of their meets at Riseholm, close to Lincoln. He coupled the toast with the name of the president. Sir Hickman Bacon responded, and expressed regret that Dr. Cragg was unable to attend. In beginning to motor he said it was good to take out the police. He started with the local superintendent, who liked it. The faster he went the better the ride was enjoyed, though the superintendent always wished him to go slowly through the villages. Captain J. A. Cole proposed "The Visitors," and said that he thought automobilists at the present day would not be considered by ordinary members of the public to be a nuisance were it not for the dust raised by the motors. He understood that the county surveyor, who was present that evening, was proposing to try in one division of the county a process for repairing the roads which should, to a certain extent, eliminate the dust nuisance. Mr. Rees Jeffreys responded. Captain Mitchell-Innes, the chief constable for Lincolnshire, also responded. He said he had taken note of a remark by the chairman as to the expediency of breaking in the professional policeman on the motor car. He, too, had adopted the same expedient, not for breaking in the professional policeman, but to put him in a better position as to speed.

During the evening songs were rendered in a charming manner by Miss Alice Jones, Mr. J. A. Cox, and Mr. A. H. Glazier.

A CONSIDERABLE amount of ink has been spilt recently in regard to the 1904 type Mercedes cars, and the result must in most people's minds be somewhat confusing. We have received a communication upon the subject from Messrs. J. E. Hutton, Limited, of Shaftesbury Avenue, who have a number of the latest Mercedes models in their hands, which is to the point and calculated to somewhat enlighten those who are desirous to understand the position. They point out that what is known as the 1903 type has the valves on the top of the cylinders, while that known as the 1904 type is similar to the 1902 type with the valves at each side of the cylinders. By way of further elucidating the matter they also point out that none of the 24-28-h.p. or 35-40-h.p. cars were made in 1903. These were all made this year and are really the 1904 cars.

Midland Automobile Club.—For Whitsun it is proposed to tour to Bettws-y-Coed, where the Waterloo Hotel will be the headquarters.

On Thursday of this week arrangements were made by the club to meet the competitors in the Side-slip Endurance Test taking place under the auspices of the A.C.G.B.I. outside Birmingham, and pilot the cars through to the Club Motor House, which was specially reserved for the occasion and the safe keeping of the competing devices. The cars were in like manner escorted out of Birmingham on the following day, an informal dinner, organised by the club, taking place at the Grand Hotel on the Thursday evening.

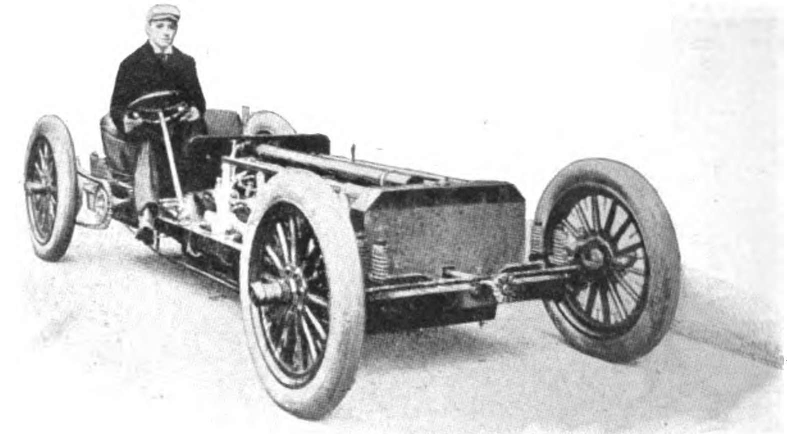
If sufficient members combine, it is proposed to arrange for a special trip to be made to the Isle of Man to witness the Gordon-Bennett Eliminating Trials taking place on May 10th.

Stratford-on-Avon was visited last Saturday by the club for the opening run of their season. About 36 members took part, and the weather was so delightful and the roads in such excellent condition that several afterwards went on to Alcester.

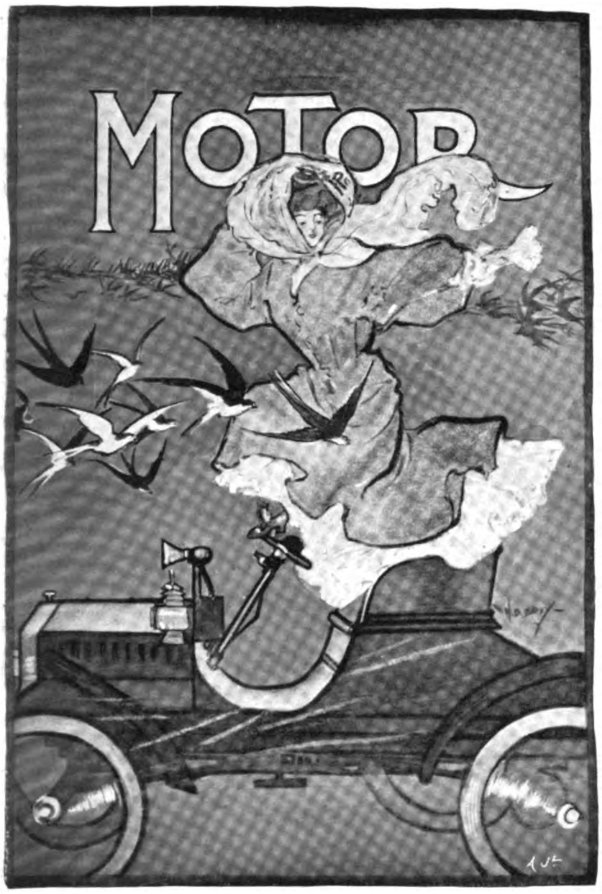
Yorkshire Automobile Club.—Fourteen cars took part in the first meet of this club on the 9th inst., when the run was to Aberford. Amongst those who foregathered at the Swan Hotel were Messrs. Tempest, Milner, Mr. and Mrs. Jessop, Mr. and Mrs. Armitage, Mr. and Miss Hepper, Mr. Kirk, Mr. Faiers, and Mr. Jackson. On the following Saturday, the 16th, Ilkley was the point selected, with headquarters at the Middleton Hotel. Arrangements had been made to meet the members of the Burnley Club, and in all a gathering of about 60 persons resulted. Amongst the cars belonging to the Yorkshire Club members were Mr. Kirk's 60-h.p. Mercedes and Mr. Hepper's Belsize.

In the Leeds district motorists should be cautious of the police trap at Roundhay Park. The trappists are situated near the police-station, and again at the old entrance to the park. Their Sabbath devotions to the "pastime" are very earnest.

A COMBINED run of motor cycling clubs, organised by the Auto Cycle Club, will take place on Saturday, May 28th, Yarmouth being the venue, the return journey taking place on the Sunday. Should this run prove successful, others will be organised to the South Coast and the West of England to meet those clubs which are unable to join in the Yarmouth run.



AN AMERICAN 100-h.p. RACER.—The chief peculiarity of the racing car shown above—which has been built by the Buffam Manufacturing Company, of Abington, Mass., for the Central Automobile Company—is that helical springs are employed instead of leaf springs for the suspension. Two of these are fitted at each end of both the front and the rear axles, so that they lie above the axles and hold the frame at a very low level beneath them. The frame itself is built of channel steel stiffened with ties beneath the side members, and to it is fixed the engine. The engine has eight horizontal cylinders, four on either side of a centrally placed crank-shaft, and these are fed from four separate carburettors. The engine is mounted in front of the car, but even the radiator is behind the front axle, and being of considerable length the dashboard is to the rear of the centre. Two fans are fitted behind the radiator, the power is transmitted to the back wheels by side chains, and a clearance of only six inches is allowed from the ground; the wheel-base is 10 ft., the overall length 13 ft., and the weight about 20½ cwt. The vehicle is to be driven in road and track races in America by Lafayette Markle, and has been christened the "Central Greyhound."



Under their usual practice, the "Motor" (U.S.A.) have again changed their front cover design for this month, a reproduction of which we show above. It will be noticed that the character of the design is in striking contrast to the previous reproductions which we have given.

About 100 "society" men are reported to have come out on strike from the Humber Beeston works last week.

The automobile has improved to such a degree that it is no longer possible to provide a satisfactory test of any particular car merely by driving it on the flat or even up a considerable hill. If a test worth having is to be made, it becomes necessary to put the car at a really formidable eminence. This is what Messrs. Mann and Overton have done with one of their 16-h.p. Georges Richard cars. They determined to tackle Porlock Hill, in Devonshire, which is said to be one of the steepest hills in England. The Automobile Club provided an Hon. Observer, and he reports that the car ascended the hill, with four passengers on board, at a speed of just under 11 miles per hour, although the roads were very heavy. Also the car was driven up that awful hill from Lynmouth to Lynton with two passengers up. Owing to the wet and greasy condition of the roads a set of Parson's non-skid chains were fitted, and proved in every way satisfactory. The gradients on Porlock Hill, which Messrs. Gall and Inglis's Contour Book declare to be one of the worst in England, vary from 1 in 10 to 1 in 6, while the Lynmouth hill has a gradient as steep as 1 in 5. The car was driven throughout these severe tests by Mr. J. T. Overton, and the gear on the car was of the ordinary medium type.

A rather curious decision was given at the Brentford Police Court under Section 9 of the Bread Act of 1822. Messrs. Whiteley and Co. have an automobile delivery car in which they send out bread. The Act of 1822 ordains that every "cart or other carriage drawn by horse, mule, or ass," used for distributing bread, must carry scales upon it. This Messrs. Whiteley's automobile van apparently did not do. Hence the charge. The magistrate, remarking that at that date it was natural that nothing should be said about a motor-propelled vehicle, dismissed the summons. He evidently forgot the Act of 1896, which contains a special provision to the effect that a light locomotive is to be regarded as a carriage for the purposes of *any* Act of Parliament. We are not sorry that the case was dismissed, as it is evidently inspired by hostility to Messrs. Whiteley's automobile baker's cart, for there are unquestionably a large number of bakers' carts drawn by horses, if not asses, which are unprovided with scales.

After Captain Morgan's case was decided *not* to their satisfaction, the police in the neighbourhood of the Addison Road for a time lost their taste for setting motor car traps. Now, however, we are informed that they have decided to reopen their campaign, and automobilists travelling along the Addison Road should look out for unpleasant surprises of the kind, particularly between the east side of the railway bridge and Addison Road Station.

Quite a run has been made recently upon quaint Dutch pictures for posters and other forms of advertising different makes of machines. We reproduce above a new picture postcard in colours, just issued by Minerva Motors, Limited. Copies of this very artistic card can be obtained gratis by any of our readers upon application to the Company at 40, Holborn Viaduct, E.C.

This country is to be congratulated on the progressive views and general attitude of both King Edward and Queen Alexandra. One day last week, during the visit of both their Majesties to Copenhagen, the Queen spent the morning in visiting the Serum Institute in company with Sir Francis Laking, while King Edward gave one more demonstration of his attachment to automobilism by taking a long drive to Dyrehaven Park in company with King Christian and Prince Valdemar, in the automobile placed at his service by Prince Demidoff, of the Russian Embassy.

We are glad to learn that at least one British motor car manufacturer will be represented at the St. Louis Exhibition. The Duryea Motor Company, of Coventry, are sending British-built Duryea power carriages to the Exhibition to form part of a combined exhibit of the several Duryea factories, including cars produced at the establishments at Waterloo, Ind., New York, and of the parent company at Reading, Pa. We, should, however, have preferred to have seen these specimens exhibited in the British section of the Exhibition.

A strong advocate of a proposal to run railway motor omnibuses between Farnham and Haslemere has just been returned for the Farnham Urban Council, second highest on the poll among a long list of candidates. He was liberally supported by all classes in the district, including the large number of rural landlords who are looking forward with great anticipation to the inauguration of the service. Sir Charles Scotter, who has recently taken up the chairmanship of the London and South-Western Railway Company, is looked to for making some extensive departures in this respect.

The 12-h.p. Gladiator car which was so deservedly successful at the Monte Carlo "Corso Fleuri" and "Concours d'Elegance," and which we illustrated in our last issue, is the particular property of *Mrs.* Walker Munroe, as distinguished from Mr. Munroe's cars. Both Mr. and Mrs. Walker Munroe have their own fancies in cars, and in a way are quite rivals with each other in always keeping their vehicles up to "concert pitch" both in appearance and general working conditions.

Frank Bostock, the showman, desirous of securing a bold advertisement, has just taken delivery of a 1¾-h.p. motor car measuring 4 feet over all in length. This diminutive vehicle has been specially built in France by Messrs. A. Lambert and Co., and is for the use of Master Francis Bostock, a youngster of 7 years of age, who takes with him as his companion "Chiquita," stated to be the smallest woman in the world.

After many months of moves and counter moves, the American Automobile Association and the American Motor League have, subject to ratification by a postal vote, agreed to amalgamate under the title of the American Motor Association. H. W. Whipple, of New York, and the president of the A.A.A., will be the president of the amalgamated bodies, with, as vice-presidents, C. E. Duryea, W. H. Hotchkiss, and A. P. Fleming. Isaac B. Potter, the president of the American Motor League, will act as secretary, at a salary of about £800 per annum.

Motor Volunteer Corps.—The undernamed gentlemen have been enrolled as members:—G. S. Burge, G. E. Watson. Mr. Leith drove Field-Marshal Sir E. Wood, V.C., commanding 2nd Army Corps, on the 12th instant, on the occasion of his visit to the Dover Garrison. The undernamed members of the corps were engaged on a staff ride under the General Officer Commanding the Eastern District from April 13th to 15th:—Messrs. W. Bloomfield, F. S. H. Dyer-Bennet, and G. E. Watson.

Lieut. H. H. Paynter has been gazetted Captain.

Dealing with the question of the manufacture of automobiles, the directors of the Hotchkiss Ordnance Company, Limited, in their report for 1903, state that new plant and machinery for the manufacture of automobile chassis at the works of the company at St. Denis have now been purchased and erected. Drawing offices have been established, and an expert staff engaged for the designing and construction of Hotchkiss automobiles. A contract for the first year's output was secured and deliveries of finished chassis have now commenced. The first complete cars produced by the company have passed satisfactorily through the most exhaustive trials. In December last a fire occurred at the works at St. Denis, which destroyed one of the buildings and stock to the total value of £9,000. The loss incurred was covered by insurance. The fire was confined to one portion of the works, and although resulting in some delay in the delivery of chassis on order, the general work of the factory was not materially interfered with. Cars of the value of £100,000 are to be delivered this year.

Messrs. Wallis and Watson, electrical engineers, Trinity Street, Leeds, have been appointed sole agents for Yorkshire for Duryea cars. An opportunity during the present week is offered to inspect one of the new 15-h.p. British-built chassis at their premises, where one of these productions is on view.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Commercial Motors (Limited), 17, Aragon Street Twickenham.—Capital, £6,000 in £1 shares. Object, to acquire the business now carried on by E. Cleaver, at Twickenham, as the Twickenham Motor Works, and a free license to manufacture paraffin motors under Patent No. 503 of 1902, granted to J. F. Walters, of Clyde House, Twickenham. First directors, G. Care, E. Care, and E. Cleaver.

Hitchon Gear and Automobile Company (Limited), Moscow Mill, St. Oswaldtwistle, near Accrington, Lancashire.—Capital, £10,000 in £1 shares. Object, to adopt an agreement with A. Hitchon for the working of Patent No. 18,460 of 1901, for improvements in transmission appliances, and to carry on the business of engineers, &c. First directors, A. Hitchon (governor), A. G. Shaw, E. Hitchon, H. B. Lawson, J. R. Hitchon, J. Weller, and Miss M. E. Hitchon.

Kensington Garage (Limited), 29, Abingdon Road, Kensington, S.W.—Capital, 2,000 in £1 shares. First directors, J. L. Symon and F. King. W. B. Sessions, manager.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published April 14th, 1904.

2,840. A. A. Longuemare. Carburettors.
2,890. A. Zurcher. Explosion engines.
3,132. — Gardner. Driving mechanism.

Published April 21st, 1904.

1,577. T. A. Silverwood. Wheels.
4,009. H. C. Brasier. Carburettors.
4,137. Gebruder Korting, A. G. Charging of internal combustion engines.

Published April 28th, 1904.

8,203. H. Livesey. Speed-changing mechanism.
9,840. A. Papleux. Resilient vehicle wheels.
10,219. G. P. Clark. Driving gear.
11,317. J. T. Andrews, Motor cycle.
12,590. A. B. Chapman. Multiple sparking device.
12,743. F. H. and C. Hall. Road wheels.
12,812. E. J. B. and K. London and W. A. Keay. Road wheels for motor lurries.
16,389. C. Price. Wheel for motor lurries.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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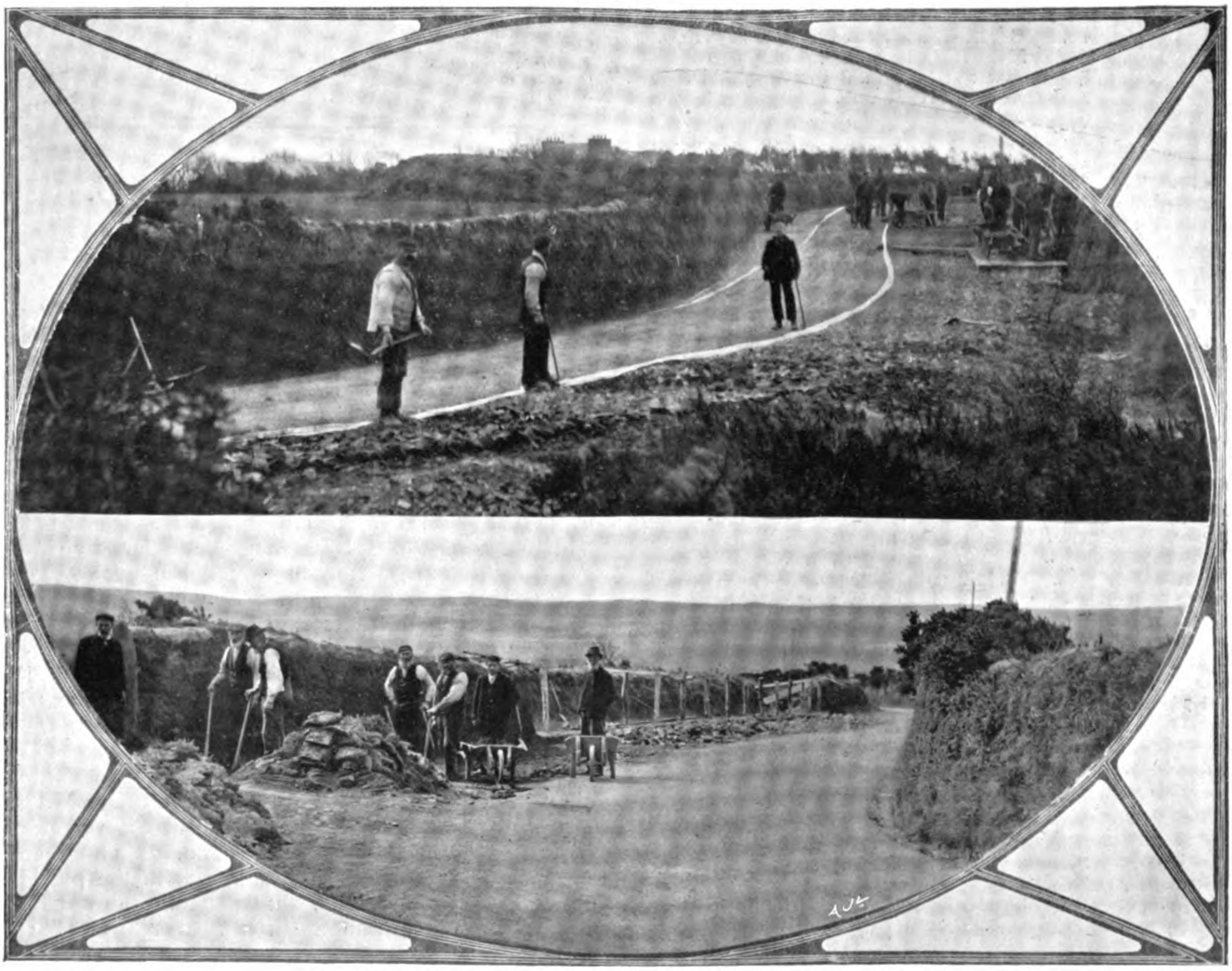

Photo by D. Collister, Douglas.

GORDON-BENNETT ELIMINATING TRIALS.—Our Lower View shows the men at work widening the road and easing the curves on the Gordon-Bennett Eliminating Course in the Isle of Man, at Cronk-ne-Bery. The extent of the alterations being effected is clearly seen in our upper picture, where the sides of the old road are indicated by the two white lines.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
April 30 ...	May Day Parade (Thames Embankment, 3 p.m.).
May 7 ...	*Side-Slip Trials.
May 7 ...	*Quarterly 100 miles Trial.
May 10 ...	British Gordon-Bennett Race Eliminating Trials.
May 11 ...	*Isle of Man Hill Climb.
May 12 ...	*Speed Races at Douglas.
May 14 ...	Auto Cycle Club Hill Climb.
May 19–20 ...	Glasgow-London Non-Stop Run.
May 28 ...	Auto Cycle Club Combined Run to Yarmouth.
May 28 ...	Nottinghamshire Club Hill Climb.
June 11 ...	Automobile Races, Ranelagh Club.
June 27–July 2	Motor Bicycle Endurance Trial.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
1905.	
May 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Apl. 30–May 12	Antwerp Salon.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May 16 ...	Carburettor Trials (A. C. de France).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8–12 ...	A.C. Bordelais Automobile Week.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12 ...	Perigueux Hill Climb (A.C. Dordogne).
May 12–15 ...	Tours Tourist Trial.
May 27 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp-Ostende Motor Boat Run.
July 15–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 14–20 ..	Paris-Deauville Motor Boat Race.
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 21 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Small Boy as a Dangerous Lunatic.

The games which children invent have for a long time interested philosophers and psychologists, from Professor Sully onwards. Recently the small boy of our streets and roads has devised a peculiarly deadly pastime, that could only be adequately dealt with by a chapter in the "pathology of mania." This is the game of "last across," which seems to have been specially designed to deprive motor car drivers of the use of their nervous systems. When a motor car, or particularly a motor bicycle, is seen approaching, the street urchins make a regular game of racing across in front of it, and the one who is last across, particularly if his coat-tails (if any) are cut by the mudguards, takes the pool and receives other honours and emoluments. This strange form of juvenile insanity has been attracting some discussion in the daily Press. What the object of the game can be it seems impossible to imagine. Its results to all automobilists are harassing in the extreme. Whether the youngsters are put up to it by their parents for the sake of possible damages from "Another motor car accident," or whether it is done simply out of a dare-devil love of danger, the results are the same. The whole thing is a subject which the police ought to take resolutely in hand. It is not merely a question of protecting the children from the probable results of their own idiocy, but is mainly one of defending automobilists from the horrible nervous shock of nearly running over a fellow creature. The thing is past a joke. We are not quite clear how far the police have power adequately to deal with it, but the subject should be inquired into, and if their powers are not adequate they should as soon as possible be increased.

The Question of Speed.

The Hon. John Scott Montagu took the chair at the Society of Arts when Mr. O'Gorman read his paper on "Popular Motor Cars." We are giving Mr. O'Gorman's paper *in extenso*, so we will say nothing about that. But in his introductory remarks Mr. Scott Montagu touched upon a question which is every day forcing itself more and more upon the attention of all who have the true interests and future development of the automobile movement at heart. Mr. Montagu introduced what was the real kernel of his remarks gradually. He commenced by discussing the subject of motor car racing, and the desirability of introducing rules by which the relative excellence of different types of car could be tested while the actual speed attained during racing was kept within reasonable limits. As he very sensibly put it, the great object for the progress of the industry was the elimination of the unfit and the promotion of the useful. From this subject the transition was a natural one to that of the ordinary everyday touring car, and Mr. Montagu did good service in pointing out that what the ordinary buyer desired was a good reliable car of moderate calibre, possessing, say, 20 to 25-h.p., and one which could be relied upon to do its duty under all normal working conditions. It is perhaps not a direct corollary to this position, but the conclusion lies near, that with the general limitation of car power the desire for more speed, as such, will generally diminish. It has always been our conviction that for ordinary road locomotion this would be a distinct benefit. At the risk of repeating what we have said on more than one occasion in the past, we would point out that under the present Act automobilism is, so to say, on its probation. The relaxation of the present stringent measure when it comes up for review in less than three years' time will greatly depend upon the popular attitude to the movement. There is nothing that so exasperates the ordinary inhabitant of country districts as unnecessary speed, particularly in dry weather on dusty roads. Mr. Scott Montagu and those who are associated with him, the Automobile Club, and other bodies which exercise a controlling force in the automobile world, are evidently wisely determined to direct a large portion of their energies to enforcing this view upon all motor car users, and we hope that practically everyone will act in this matter as the majority are already doing, and (unless very special circumstances compel them to put their cars to high speed) moderate their passion for rapid travelling out of consideration for the feelings of the general public, and with the ultimate view of benefiting the movement in whose welfare they cannot fail to feel a very direct concern.

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Westrumite and the Dust Trouble.

This hostility to even moderate speed is in country places so largely a question of dust, that we learn with satisfaction, from the meeting of the Westrumite Company, that this apparently highly effective dust-layer is coming more and more into demand. It is an encouraging sign that the greater portion of the orders received for Westrumite are from Corporations and other municipal authorities. The King, too, who is generally the first to recognise effective new appliances, ordered Westrumite to be used on the Punchestown road, the races at which place he attended during his visit to Ireland. As in Ireland, last year, the greater portion of the Gordon-Bennett course is to be treated with Westrumite. In fact, the new preparation promises very well, and it certainly seems as though it would go a long way towards eliminating the dust nuisance.

Whether the dust question be ultimately solved by means of Westrumite or some other preparation, the future of the automobile movement is, as we have repeatedly pointed out, largely bound up with the solution. It is not merely a question of the comfort of car users themselves. It is a question of public hostility to the movement. The majority of people, where their pockets are not directly concerned, do not really dislike the automobile in itself. This may be seen in the fact that there has been no outbreak of popular hostility this year, though motor cars have been plentiful on our roads, for the roads have been wet, or at any rate dustless, nearly the whole of the spring. Even the Juggernaut outbreak of last year synchronised with the time of year when the roads were most dusty. It is no use blinking the fact. On a dusty road the automobile, at anything approaching high speed, does raise an enormous volume of dust — and consequently of popular resentment. If we can only make our roads dustless, popular dislike to the motor car will die out with rapidity, for most Englishmen have at bottom a profound respect for mechanical triumphs won against the forces of nature. It is for this reason that we are hearty well-wishers of Westrumite, as we would be of any process or manufacture that holds out a hope of getting rid of the dust nuisance.

We are glad to be able to record, therefore, that Mr. Scott Montagu's Dust Prevention Committee has begun to make experiments, both in some of the London streets and on the well-known stretch of road called Fairmile, near Cobham. This length of road has been treated with Westrumite, the first application being made on Tuesday in last week. This road, though good at this time of the year, becomes distinctly dusty in the middle of summer, and this ought therefore to be a fairly satisfactory test road to prove the properties of Westrumite during the coming year. It is satisfactory to be able to announce that the London County Council are also making similar experiments, and that a mile of road on the Victoria Embankment is to be similarly treated. If Westrumite proves to be as adequate a preventer of dust in the long run as it seems to be for short periods, and if these experiments are to be continued on an extended and elaborate scale, we may look forward at an early date to having a large number of our principal roads rendered really practically dustless.

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The Motor Wagon.—An Important Case.

Perhaps it was a Pyrrhic victory, for though the case was undoubtedly dismissed, it was only dismissed because the magistrates were equally divided. But the matter in dispute is of the very greatest possible importance to all users of steam lurries. We are referring, of course, to the case in which the Penrith and District Road Carrying Company was summoned for running what the local police authorities insisted on regarding as a traction engine, without conforming to the Locomotives on Highways Act of 1898. It was admitted that the vehicle in question weighed over 3 tons, even without water and fuel, and though registered with the London County Council as a motor car, it was contended by the prosecution that the County Council had no power so to register it. Everyone, including the Local Government Board, has felt that the state of affairs, in regard to this important question, is highly unsatisfactory. The Local Government Board is taking evidence on the tare subject, and will, no doubt, at an early date, propose alterations in the regulations of the law which may afford the necessary relief. It is a relief that is needed, for there are a number of cases in which self-propelled lurries, doing good work, exceed the weight limit of 3 tons. In the meantime, pending the required action on the part of the authorities, the Penrith case may give some pause to the local busybodies who are endeavouring to take advantage of a technical mistake in the Acts of 1896 and 1903, to cripple and interfere with one of the branches of automobilism, which is of the greatest industrial importance to the community. The Act of 1896 ordained that the 3 tons need not include the weight of accumulators, and that vehicles weighing under 3 tons without accumulator might be regarded as "light locomotives" under the Act. This concession was probably intended for the benefit of electric vehicles. But who says that electric accumulators are the only accumulators in existence? Mr. Staplee Firth, who appeared for the defendant Company at Penrith, stoutly maintained that the boiler (and its appurtenances) on a steam vehicle is an accumulator. It certainly is. It receives energy from the combustion of fuel, converts it into a dynamically available form, accumulates it and keeps it stored until it is wanted, and supplies it as required. It is as much an accumulator as the hydraulic accumulators, which have been in use in every one of our great steel works for generations, are accumulators. The Bench retired for a considerable length of time to consider this knotty point. Perhaps it is not to be wondered at. They had probably never had such a nut to crack before. Finally their numbers were divided—one half apparently being of opinion that a boiler is an accumulator, and the other half that it is not. Perhaps had more of them undergone a course of elementary physics, they would have recognised that a boiler really is an accumulator, though some people never can realise that an appliance can be two things at the same time. Because it is also a transformer of energy it does not follow that it is not also an accumulator of energy. Very probably the framers of the 1896 Act meant the section to apply only to electric accumulators, but they did not say so, and as a learned judge once observed, it is with what a statute says that legal tribunals must be concerned, not with what the legislators possibly meant—"because," as he added, with a contraction of the judicial eyelid, "they have sometimes meant nothing at all." Perhaps the successful result of the Penrith case will have the result of damping the ardour of the local *quidnuncs* in their not very commendable attempts to paralyse a growing industry.

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The Year's Work of the Roads' Improvement Association.

On the 27th instant the Roads' Improvement Association held its annual meeting at the Westminster Palace Hotel, when the report was presented. The Association has done admirable work during the past year. Though its activity is calculated to be of use to all users of roads and streets, it is pre-eminently automobilists who will benefit by the ultimate introduction of the reforms which the Association has for so long persistently and energetically advocated. To deal with all the reforms which the Association has advocated during the past year would lead us too far, and we must content ourselves consequently with a reference to one or two of the principal. Notable amongst these are the advocacy of a new bye-law for London, which shall have the effect of confining all slow-moving traffic to the immediate neighbourhood of the kerb. On this subject there has been correspondence between the hon. secretary of the Association and the clerk of the London County Council. The County Council had approached the Home Secretary and the Home Secretary had declared that it would be more in accordance with precedent if the proposed bye-law should only enforce the salutory restriction in question in certain of the main streets. To this the hon. secretary of the Roads' Improvement Association strongly objected, on the very sensible ground that it was unreasonable to expect drivers to discriminate between streets in which the bye-law is enforced and those in which it need not be observed. This strange respect for precedent as a fetish in such matters, irrespective of whether it is a sensible precedent or not, is one of the things for which it is extremely difficult to entertain any sympathy, and we trust the contention of the Association will ultimately be respected. Another matter of importance to which the Association has directed its energies during the past year is the alleviation of the dust nuisance, and a considerable quantity of information has been collected on this important question. Only less important is the country bridge question. Lords of the Manor, Corporations and local bodies who are responsible for the maintenance of bridges, have in course of time allowed them to become reduced in strength, with the result that many of them are unsuited for the ordinary traffic of the road, and in particular the automobile traffic. The Association are accordingly pressing for the amendment of the law, so as to give the county authorities power to demand that such bridges shall be maintained up to their original standard of strength.

It will be observed from these few examples from last year's propaganda that the Roads' Improvement Association has been doing good work on behalf of all road users. As automobilists are mainly interested in the questions to which we have referred—the regulation of slow-going traffic, the abatement of the dust nuisance, and the prevention of restrictions on their movements due to the unsatisfactory condition of bridges—we trust that they will recognise the important work which the Association is doing, and accord it in future an even more hearty support than they have done during the past.

LIEUT.-COLONEL HOLDEN, the Chairman of the A.C.G.B.I., has been promoted to the rank of Colonel.

SOME time ago we dealt with the rather unsatisfactory condition of the Australian patent law which, while providing for patents to be filed for the whole Commonwealth, will not be made effective till the Commissioner is appointed. We are now informed by a firm of patent agents that there is a probability of this step being taken in about two months, and that after that date patentees will be able to make one application for the whole of Australia. In the meantime they may file their patents for that purpose, and these patents will bear date as from the commencement of the Act, whenever the Commissioner is appointed.

THE 6½-h.p. BABY PEUGEOT.

AMONGST the small voiturettes of European construction, the "Baby Peugeot" has, perhaps, during the past few years, earned as great a popularity as any other that has been placed on the market, for it was the first vehicle of this type to be offered at a price below £200. It may, therefore, be regarded as the prototype of the large number of small vehicles of similar design which are now more or less familiar to our readers—a type in which a high-speed, single-cylinder, water-cooled engine is employed in conjunction with a change-speed-gear of the sliding spur-wheel type, and a propeller-shaft transmitting the power to a live-rear-axle. The earlier model was fitted with a 5-h.p. engine, but this year a more powerful car has been introduced as well, and it has been improved in many respects, besides being altogether a more serviceable machine for general touring purposes. The new model has a 6½-h.p. engine.

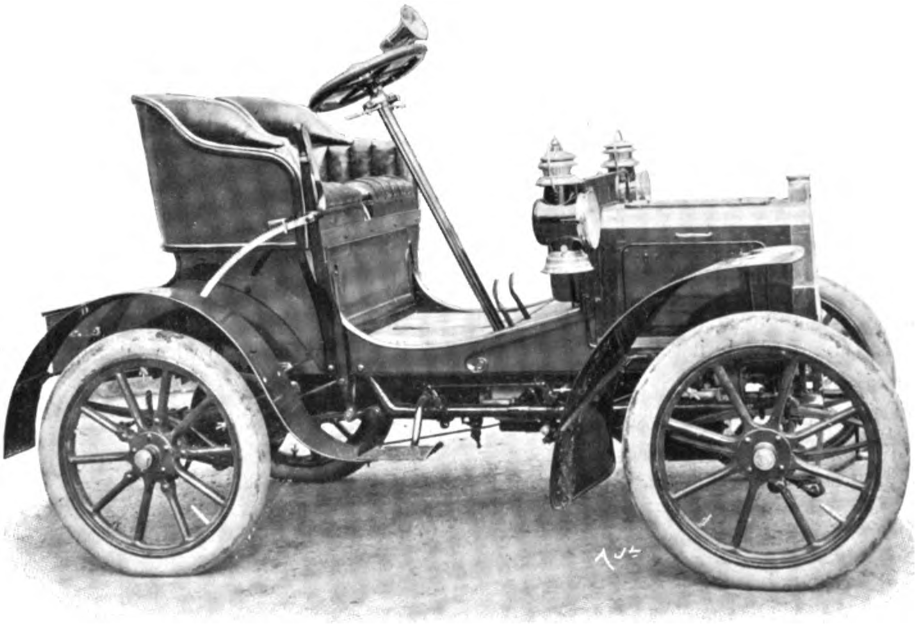


FIG. 1.—The 6½-h.p. Baby Peugeot.

The general appearance of the 1904 model is shown in Fig. 1, where it will be noticed that it accommodates two persons, and that comfortable bucket seats are provided for them. Another noticeable improvement is that it has a honeycomb radiator that forms the front of the bonnet as on most large vehicles. The chassis is seen from the right-hand side in Fig. 2, and from above in Fig. 3, from which views the general arrangement of the mechanism can be readily gathered, whilst in Fig. 4 a view of the front portion of the chassis from behind is given.

The main frame, which is tubular, is of somewhat peculiar shape, for the side members are curved upward and pass along at a higher level beneath the seat. These members are held together in front by a curved bent transverse tube, at the back by a flat bar, and there are also two intermediate transverse tubes—one at either end of the gear-box. The frame is carried upon double elliptic springs above both axles, the springs lying outside the longitudinal members of the frame. The front axle is tubular, is slightly bowed down towards the centre, and carries forked brackets at its ends for supporting the steering heads, both above and beneath. The live-rear-axle is constructed as on larger vehicles, so that the whole of the revolving parts are completely enclosed; the shafts inside the stationary casings are mounted in ball bearings. This axle is at either end connected as seen with the main frame, by adjustable radius rods—hinged at both ends.

The wheels are of the artillery type, and are shod with 700 mm. by 75 mm. Clipper Continental pneumatic tyres, which, considering that the vehicle only weighs about 7 cwt., are of ample size for the work which they are called upon to perform. This little vehicle has a wheel base of 5 ft. 7 in., and the track is 3 ft. 6 in.

The engine is fixed direct to the longitudinal members of the main frame, by bolting the projecting feet of the crank-chamber to brackets that project inwards from, and are securely fixed to, those members. It has a well-jacketed cylinder, the valve-chamber of which is formed in front, with the atmospheric inlet-valve mounted immediately above the exhaust-valve. The cylinder has a bore of 110 mm., and the stroke is 110 mm. The engine is of the high-speed type, in which a built-up crankshaft is employed, and two flywheels are provided inside the crank-chamber. It runs at a normal speed of 900 revs. per min., and is capable of giving up to 7½ h.p. on the brake. The atmospheric inlet-valve is held in place by a yoke and a single nut, and the induction pipe, which passes up to it from the float feed carburettor on the right, has a throttle valve introduced into it. This throttle valve is controlled by one of the small hand-levers on the steering pillar, and another similar lever regulates the air supply to the carburettor. The petrol tank, which has a capacity of 3½ galls., is placed behind the dash, and this quantity of fuel is sufficient for travelling a distance of about 150 miles.

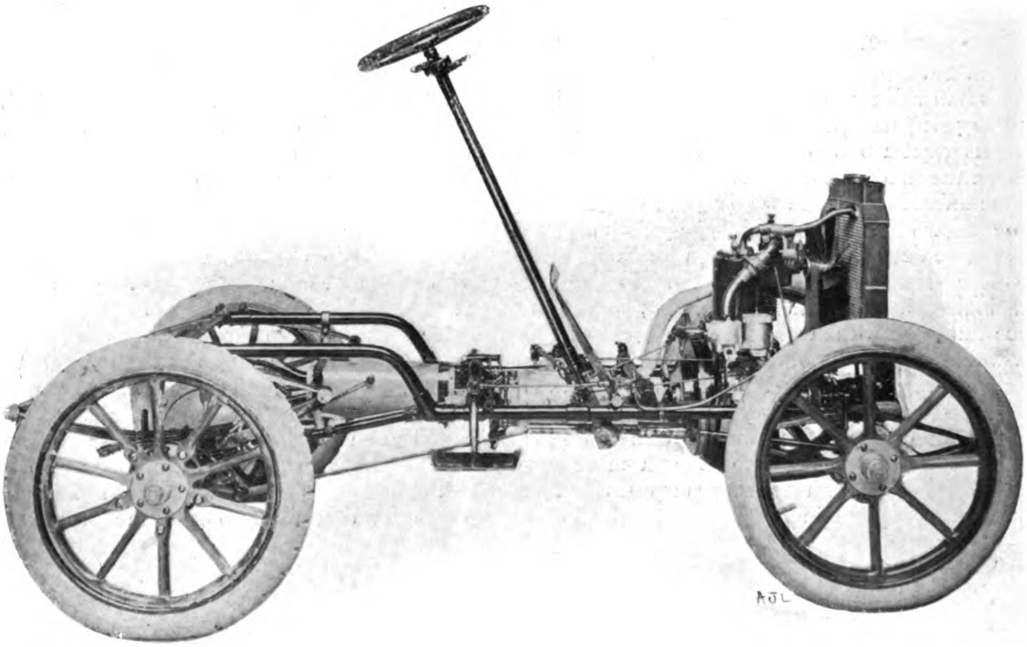


FIG. 2.—View of the Baby Peugeot Chassis from the Right Side.

The starting-handle is mounted in front of the car, and is so fitted that it will remain in an upright position there when not in use. It fits direct upon the crank-shaft, and detaches itself automatically, as usual, as soon as the engine has been started. The commutator, too, is arranged right in front, it being driven off the front end of the short cam-shaft, about which it can be rocked for timing the ignition in the ordinary manner, by a hand lever on the steering-pillar. A high tension system of ignition is employed, and the ignition plug is fitted vertically into the cylinder-head between the inlet-valve and a half-compression cock.

The water is circulated direct from the honeycomb radiator in front, through the cylinder-jacket, by a centrifugal pump which lies to the left of the engine, and is driven frictionally off the flywheel. The radiator, which is built up of small square tubes, has a capacity of about 2¼ galls.—sufficient for about 500 miles—and there is a very effective fan mounted immediately behind it driven by a flat belt off the engine.

The engine is fed with oil from a drip-feed lubricator on the dash-board, the oil being distributed as usual, over all the friction surfaces, by the "splash" in the crank-chamber.

The main clutch is of the internal cone type, and has a leather-faced inner member. This member, too, is fitted with an external disc, which is so arranged as to come into contact with a brake-pad, when the clutch-pedal

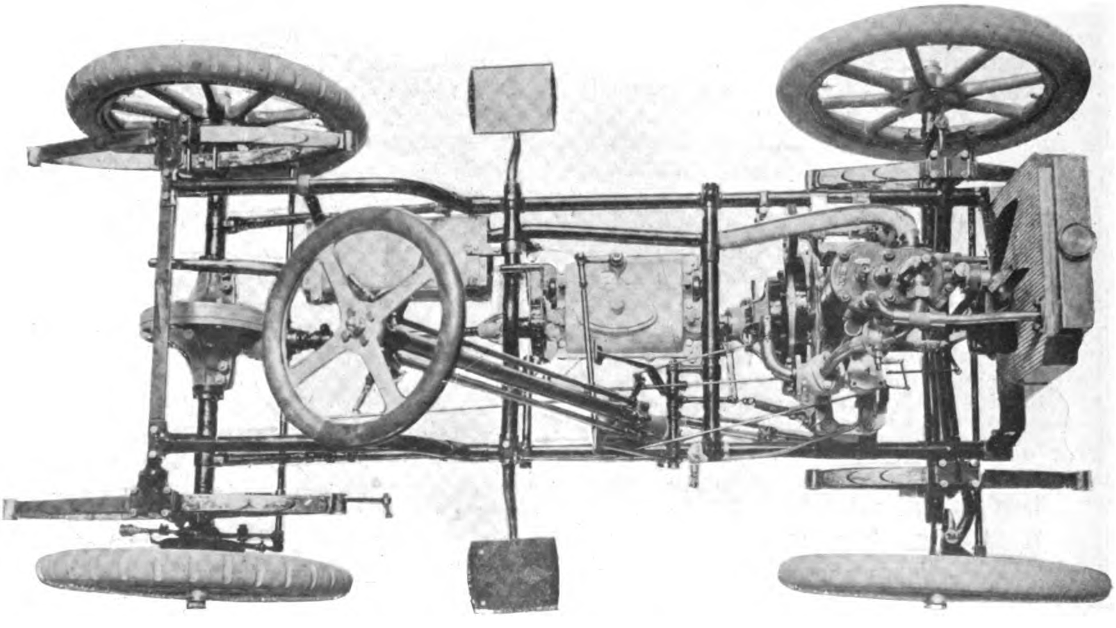


FIG. 3.—View of the Baby Peugeot Chassis from Above.

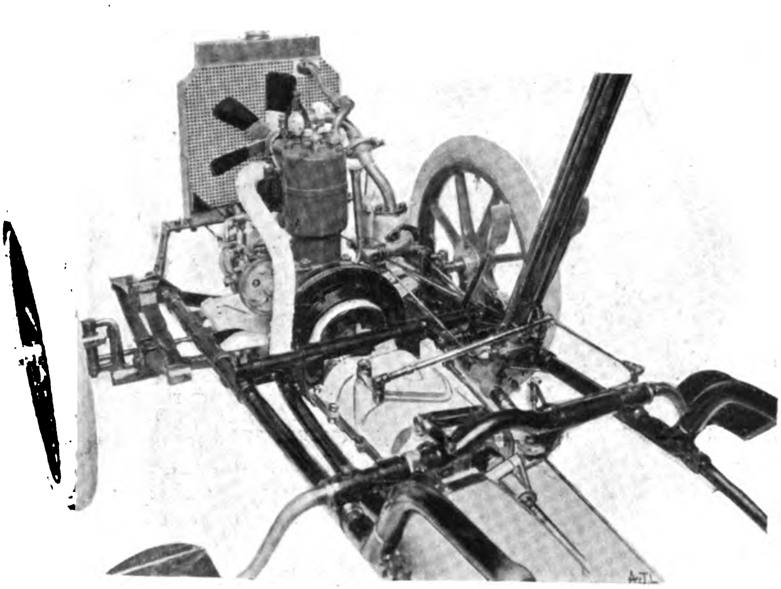


FIG. 4.—Front Portion of the Baby Peugeot Chassis.

is fully depressed, so as to thus retard the gear-shaft when changing up from one speed to another. The clutch-spring is enclosed inside the clutch, but is adjustable. The clutch is operated by the pedal on the left, and it is also inter-connected both with the foot and the hand brakes, so that it is automatically disengaged when either of them is applied,

The change-speed-gear, which provides three forward speeds and a reverse, is shown in its "reverse" position, with the cover, D^1, removed, in Fig. 5. The gear-box is made in two halves, D and D^1, between which lie the plain bearings for the direct-through-shaft and for the lay-shaft. The clutch-shaft, upon which is seen the internal clutch-member, A, terminates just inside the box in the spur-wheel, A^1. The shaft, B, which has a square cross-section inside the box—and carries the brake-drum, B^3, and the universal-joint coupling, outside—takes a bearing at its forward end inside the wheel, A^1. The two spur-wheels, B^1 and B^2, are free to slide upon the shaft, B, and, when moved rearwardly as far as they will go, jaw-clutch members on the wheel, B^2, engage with similar jaws on the wheel, A^1, giving a direct-through-drive from the clutch to the propeller-shaft.

The lay-shaft, C, which lies to the left of the direct-through-shaft, is at all times caused to revolve by the wheels, A^1 and A^2, which remain in mesh with one another. The lay-shaft, C, also carries the gear-wheels, C^1, C^2, and C^3, C^1 corresponding with the wheel, B^1, C^2 with the wheel, B^2, and the wheel, C^3, meshing with an intermediate gear-wheel, with which the wheel, B^1, is shown in gear in our illustration. As the sliding-wheels are drawn forward from the position shown, the wheel, B^1, meshes with the wheel, C^1, giving the first speed, and afterwards the wheel, B^2, comes into gear with the wheel, C^2, for the second speed, whilst finally the jaw-clutch members engage with one another for the top gear. When the top gear is in use, the car runs at a normal speed of $27\frac{1}{4}$ miles per hour. The sliding-wheels are controlled by a small horizontal hand-lever on the steering-pillar, which is connected by a simple system of levers, as seen in Figs. 3 and 4, with the short rocking-shaft, E. The shaft, E, passes through a separately-detachable cover-plate, D^2, in the top of the gear-box. The change-speed-gear is lubricated through two pipes passing to the main bearings from the dash-board.

The propeller-shaft and the universal joints do not call for any special comment, for they are arranged in the usual way, and the differential gear on the back-axle is driven by bevel wheels.

The band-brake acting upon the drum, B^3, immediately behind the gear-box, is operated by the foot-pedal on the right, and it, like the side brakes, is so arranged as to act equally well backwards as forwards. The side brakes are simultaneously applied by the side lever seen in Fig. 1, which, being attached to the body, is therefore not visible in our other illustrations.

The steering-gear is of the rack and pinion type, and, as seen, is operated by a wheel mounted on a sloping pillar. The steering-pillar is fitted with the four small hand-levers to which passing reference has already been made. Not only is the speed of the engine entirely controlled by them, but so also is the change-speed mechanism. The upper lever on the right regulates the throttle, the lower lever on that side operates the change-speed-gear, the upper lever on the left controls the main air-feed to the carburettor, and the lower lever on the left varies the time of ignition.

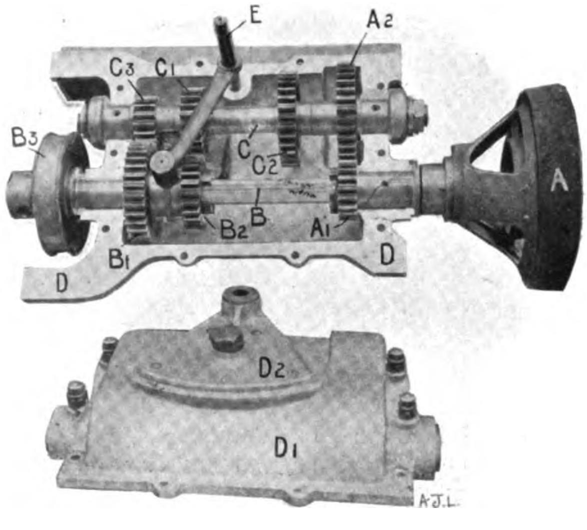


FIG. 5.—The Baby Peugeot Change-Speed-Gear with Cover Removed to show the Spur-Wheels.

These little vehicles are nicely designed and neatly made throughout, and appear to be capable of standing a good deal of continuous hard work. They are fitted with well-made and comfortable bodies, the upholstery work on which is of good leather and the general finish of which leaves little to be desired.

PROFESSOR C. VERNON BOYS, F.R.S., has accepted a seat on the committee of the A.C.G.B.I.

THE 24–H.P. "AUTOMOTOR" PETROL CAR.

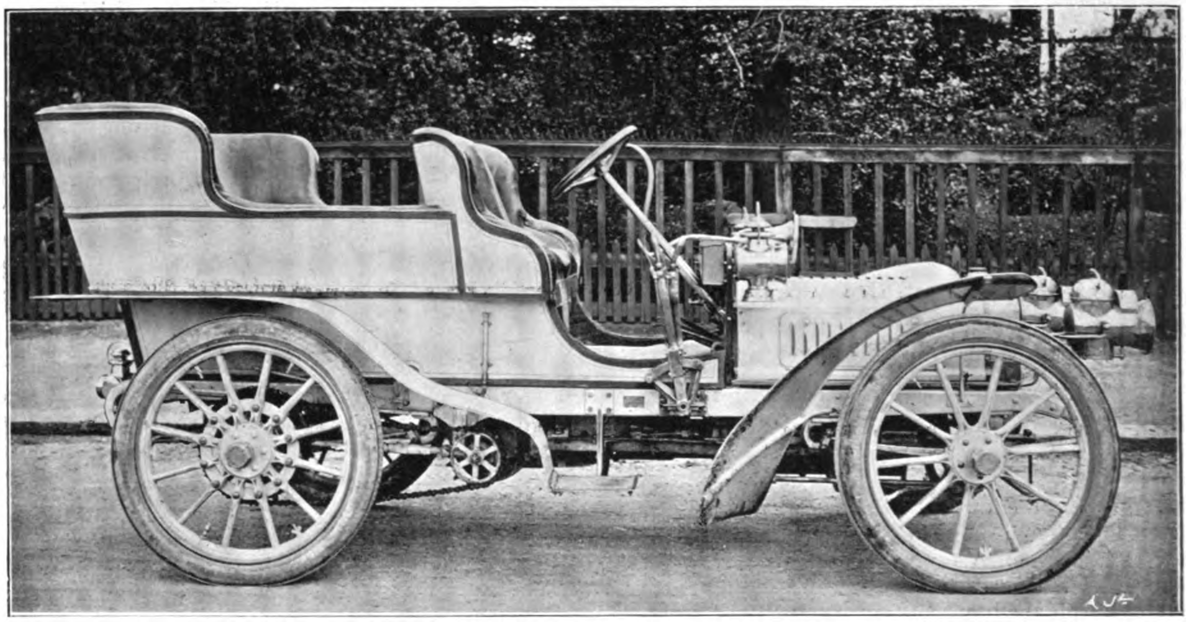
This vehicle is one of the larger models made by the Soc. Anon. de Constructions Mecaniques de la Loire, for whom the Automobile Components, Limited, of Euston Road, are the English agents. It is of the chain-driven type, and is constructed on thoroughly up-to-date lines throughout, as a powerful and fast touring car. In general arrangement it does not differ materially from many other well-known vehicles in which side-chains are employed for driving the rear wheels, but in several respects it has features of interest, as will be seen from the illustrated description which we are now able to give. Notable amongst these are the expanding metal to metal main-clutch, and the provision of two independently operated foot-brakes on the countershaft.

The chassis is shown—from the side and from above—in Figs. 1 and 2; the engine—from the left side and from in front—in Figs. 3 and 4; the inner member of main-clutch in Fig. 5, and the gear-box—complete and taken apart—in Fig. 6.

The main-frame of the chassis is constructed of pressed steel, and to it is fixed an angle underframe that carries the engine and the gear-box—both of which are fixed very low down. The usual long, semi-elliptic, side springs are fitted between the forged axles and the frame, and the ordinary adjustable radius rods are provided for tightening the side chains.

The engine has its cylinders cast in pairs, and the mechanically-operated inlet-valves are placed on the opposite side to the exhaust-valves; each set of valves is operated by a separate cam-shaft. The cam-shafts, together with the cams, are enclosed in the crank-chamber, but the spur-wheels by which they are driven from the crank-shaft are mounted outside the chamber, in front; these wheels are built up of fibre and brass. Low-tension make-and-break igniters take the place of inspection covers immediately above the inlet-valves, each pair of these being held down by a yoke and a single nut in just the same way that the plain covers are secured in place above the exhaust-valves. The igniters are operated by means of vertical rock-shafts from the same cam-shaft that controls the inlet-valves, and the electrical connections are made with their insulated terminals by chopper switches. The time of ignition can be varied from the hand-lever that is mounted above the steering wheel; it rocks the horizontal shaft, A (Figs. 3 and 4), causing the vertical operating shafts, A^1, to slide longitudinally up or down so that the cams engage with them earlier or later in the cycles of operation.

The carburettor, B, which is of the float-feed spray type, is fixed to the crank-chamber on the right side, and a throttle valve is fitted, just below the induction pipe, so that it is controlled by the centrifugal governor, C, in the gear wheel on the exhaust cam-shaft. This governing mechanism is subject to the control of an accelerator pedal in much the usual way.



A 24-h.p. "Automotor" Petrol Car.

The magneto, D, is also fixed to the crank-chamber on the right side, and it is driven by gearing from the spur-wheel on the inlet cam-shaft. It revolves at the same speed as the crank-shaft. On the other side of the engine is fixed the circulating pump, E, and this, too, is gear-driven, the pinion on its spindle meshing with the large spur-wheel inside which the governor is fitted. The pump forces the water into each of the jackets in the neighbourhood of the exhaust valve chambers, and the water is then led out at the top of the jackets back to the honeycomb radiator at the front of the car. A belt-driven fan is mounted immediately behind the radiator. Separate exhaust pipes are led from each pair of cylinders, these joining together at the front end of the long exhaust box which lies, on the left side, beneath the frame.

The cylinders have a bore of 110 mm., the stroke is 150 mm., and the engine is capable of developing about 26-b.h.p. The speed is controlled entirely by the governor, subject to the action of the accelerator pedal,

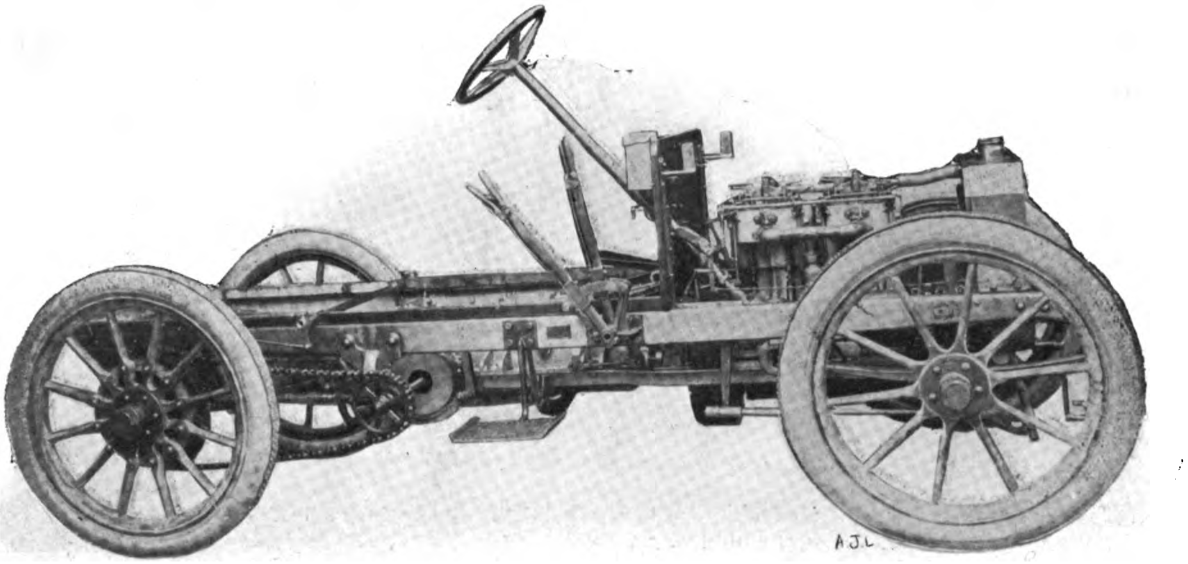


FIG. 1.—Side view of the 24-h.p. "Automotor" Chassis.

the only other provision made for regulating it being the timing lever above the steering wheel.

The inner member of the main-clutch is seen from the front in Fig. 5, and it is also visible from two other points of view in Fig. 6. This member carries two half rings, F, which are attached at their one ends to the main-casting, and are connected by toggles, F^1, at their other ends, to rods, F^2, that pass through the main-casting to the pedal-controlled sliding sleeve on the other side of it. This sleeve is normally forced forward by the usual helical spring, and is withdrawn when the clutch pedal is depressed; when moved forward, the rods, F^2, act upon the toggles, F^1, and force the half rings, F, against the internal drum formed inside the large flywheel. The inner member of the clutch is fixed to the shaft, H, that passes through the gear-box, and has a square section inside the box for carrying the sliding spur-wheels.

The change-speed-gear gives four forward speeds and a reverse, and is of that type in which the lay-shaft, G, lies immediately above the direct through-shaft, H. Three sliding wheels are mounted, together, upon the through-shaft, and these are controlled by a fork attached to a sleeve having a toothed rack fixed to it. The operating spur-wheel engages with the rack, and by this means the change-speed lever at the side of the car is caused to operate the gear. The direct-through drive on the top speed is obtained by bringing the rearmost of the three sliding wheels inside the spur-wheel, J, to which the bevel wheel driving the differential is connected, internal teeth being provided inside the wheel, J, for this purpose. The "reverse" is, as usual, obtained through the wide intermediate spur-wheel, K.

The shell of the differential gear is connected by sleeves, passing through the bearings in the gear-box, with external flanges, to which water-cooled brake-drums are bolted on either side of the gear-box. The two ends of the differential countershaft project through these, and are supported just inside the sprockets, from which the side chains pass to the rear wheels, by ball bearings fixed to the side members of the main frame. The two brake-drums referred to are operated by separate pedals, one of which—that on the right—is inter-connected with

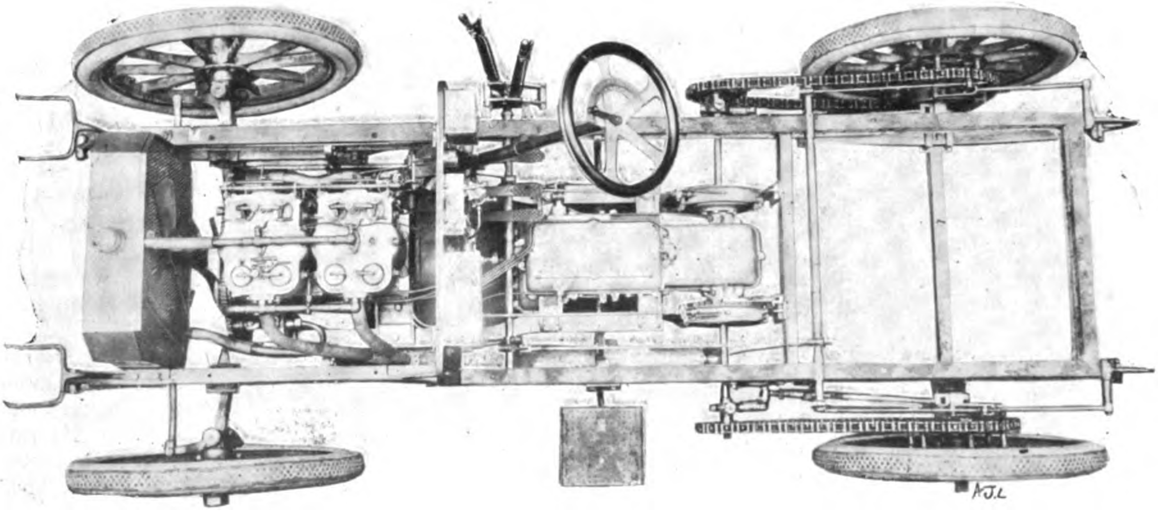
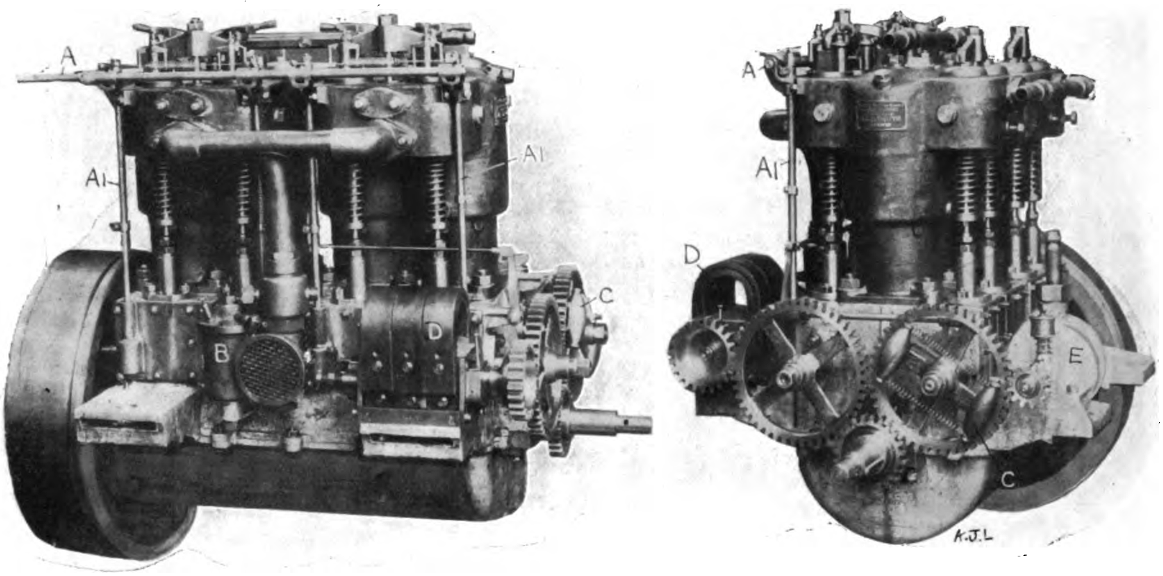


FIG. 2.—View of the 24-h.p. "Automotor" Chassis from above.



Figs. 3 and 4.—The 24-h.p. "Automotor" Petrol Engine from the right side and from the front.

the clutch so as to withdraw it before applying the brake. The other foot pedal is not so connected, but is quite independent. Both these pedals have the effect of tightening metal shoes about their respective brake-drums when they are depressed, and a ratchet and pawl device is fitted just inside the drum on the left so that it acts as a sprag. The side brakes are of the external type.

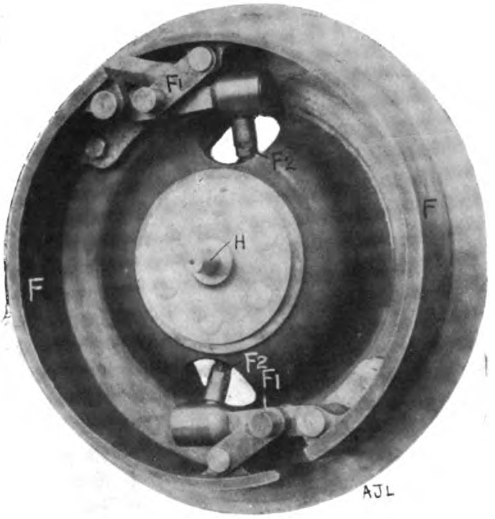


Fig. 5.—The Internal Expanding Member of the "Automotor" Main Clutch.

The engine and the transmission gear are lubricated from a multiple sight-feed lubricator on the dash, and there is also a lubricator to which is fixed a small hand-pump for feeding the engine.

This vehicle is of very substantial construction throughout, and is capable of travelling at a high rate of speed. The company also make a variety of other vehicles ranging from a single-cylinder voiturette to cars of larger size than that which we have just described. Amongst these is a vehicle having a twin-cylinder 10-14-h.p. engine, which has been put on the market at an unusually low price. It has an armoured wood main-frame, which is stiffened by tie-rods, and the engine and gear are carried upon a channel underframe. The vehicle is of the live-axle type, and there are three forward speeds and a "reverse." The inlet-valves on the engine are atmospherically operated, and are so arranged, in conjunction with the governor, that they are prevented from opening when the engine exceeds its normal speed. A low-tension magneto system of ignition is employed, and a gear-driven pump is used for circulating the water. The main clutch is of the cone type, and it is constructed so as to be quite separate from the flywheel. The live-rear-axle is enclosed in an aluminium casing, which is of considerably larger size than usual.

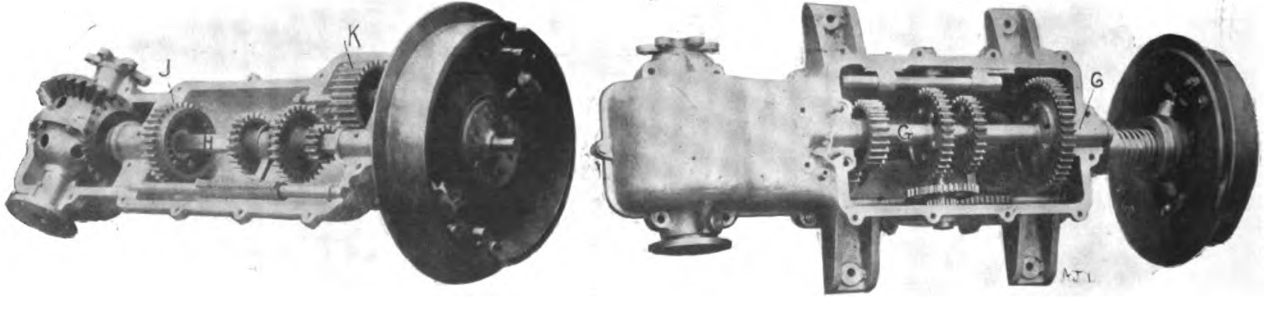


Fig. 6.—Views of the Change-Speed-Gear on the 24-h.p. "Automotor" Car.

THE WILSON-PILCHER PETROL CARS.—PART III.

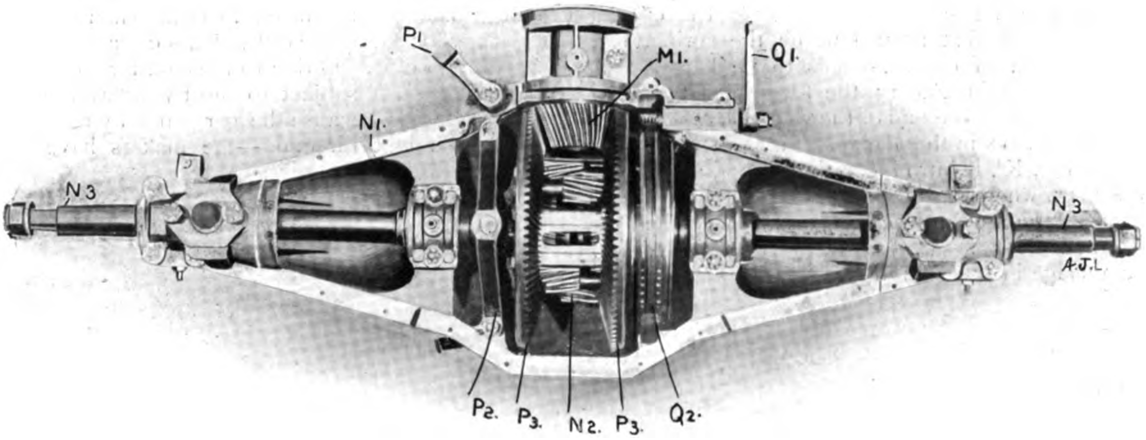


FIG. 16.—View from above of the Wilson-Pilcher Live-rear-axle, with the Cover removed to show the Internal Mechanism.

IT will be noticed in Fig. 13 that all the gear-wheels have true helical teeth, and that therefore the frictional losses in the gear are very small. It will also be noticed that the only strains imposed on the moving parts are torsional because there are three planet wheels, and because the moving parts are all in balance. It should be pointed out that the internally toothed ring slides along with the shell of which it forms a part, and that this does not in any way interfere with the proper working of the mechanism. Adjustments are provided for both cone clutches independently, and the form of clutch used has metal-to-metal friction surfaces; the outer members are made of steel, and the inner members have copper faces riveted to them. The internal clutch can be adjusted in exactly the same way as has been described in connection with the double-cone main clutch—by the bolt, T^3, and a wedge-shaped block, T^2. The external clutch is adjustable by the means provided for bodily sliding the clutch-ring, L^{11}, longitudinally. The projecting lugs, by which the clutch-ring, L^{11}, is fixed to the casing, are fitted between wedge-shaped blocks, T^4, which can be fed inwards or outwards by the bolts, T^5. In order to take up any wear which may have occurred, it is only necessary to slacken the bolts, T^5, that lie in front of the brake-ring, L^{11}, and to tighten up those behind it. The blocks, T^4, lie with their wedge-shaped faces against sloping surfaces formed in the gear-box, and their inner straight faces butt up against the clutch-ring—the bolts, T^5, pass through slots in the gear-box, and can, therefore, travel along with the blocks, T^4.

The epicyclic gear which we have just described is that which gives the speed reduction of about 2·7 to 1 when it is in use, for the wheels arranged in this way give a reduction of speed ratio which can be calculated by dividing the number of teeth in the sun-wheel, L, by this same number plus the number of teeth in the gear-ring, L^5.

The other epicyclic gear—which, when used alone, gives the second speed—has its sun-wheel, K^3, mounted freely upon the shaft that connects the cage, K^4 (containing the planet-wheels), with the propeller-shaft-coupling, K^{10}. The various parts of this gear are shown separately in Fig. 14. The gear-wheel, K^3, is riveted to a casting, K^6, which has an inner and outer cone face provided upon it. This casting is also bolted to another casting, K^7, so that the two together form a shell that encloses the entire gear. The shell is capable of longitudinal motion upon the shaft and, although it normally revolves with it, it is mounted freely upon it. Inside it, and keyed to the end of the shaft that connects this epicyclic gear with the other gear is the casting, K^5, which forms the internally-toothed gear-ring that meshes with the planets and has its outer face formed into a cone for engaging with the corresponding face inside the casting, K^6. A strong spring, K^{11}, is fitted between the castings, K^5 and K^7, and this normally causes the clutch faces on the castings, K^5 and K^6, to come into engagement with one another; the entire gear then revolves as one piece, so that it is quite inoperative. The gear is introduced, when required, by the lever, K^9, which is fitted in precisely the same way as are the levers, L^{12} and J^9, for the other gear and for the main clutch, respectively. When the shell formed by the castings, K^6, K^7, and the wheel, K^3, are forced rearwardly, then the shell is held stationary by the brake-ring, K^8, so that the gear reduces the speed of the propeller-shaft relatively to that of the engine in the ratio of about 1 to 1·7. In this case the members of the epicyclic train are so arranged that the speed-ratio can be ascertained by dividing the number of teeth in the gear-ring by this same number plus the number of teeth in the sun-wheel.

It will be realised that a considerable amount of ingenuity has been displayed in the design of the change-speed-gear and of the clutch, and it should specially be pointed out that, although the whole of the machinery runs in an oil bath, in a dust-proof case, yet the various adjustments, which are very complete in themselves, can be attended to from the outside. Particular care has been taken to avoid the use of any locking devices which could, under any conditions, shake loose or come off, and some of these are of extremely neat, and we believe novel, design. An instance of this is shown in Fig. 15, where the two rearmost portions of the direct-through-shaft are also seen. These two portions of the shaft are hollow, and are connected together by the double-ended spigot seen between them. The two sleeves, seen above these portions of the shaft, telescope over one another, and over the portion of the shaft that is seen to the right—they can be recognised in position in Fig. 11. The flange which screws over the end of the inner sleeve is that against which the spring, K^{11}, presses, and this, of course, needs to be locked very securely. As seen in Fig. 15, the flange has two slots cut radially in it, and the end of the sleeve, too, is slotted opposite to the slots in the flange. Between the flange and the casting, K^5, is introduced the washer, seen to the left in Fig. 15, where it will be noticed that it has two projections formed upon it, corresponding with the slots in the flange fitting. The projections on the washer not only engage in the slots in the flange, but also with those in the sleeve, so that it is quite impossible for the flange fitting to become unscrewed.

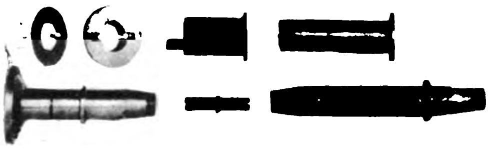


FIG. 15.—Some Shafts and Sleeves of the Wilson-Pilcher Change-speed-gear.

The Live Axle.

The live rear-axle, with the upper portion of the aluminium casing removed, is shown from above in Fig. 16. The casing, N^1, provides four long plain bearings for the two half-shafts, N^3, and the differential-gear, N^2, is mounted centrally between the large bevel wheels. P^3, which are fixed to its shell. These bevel wheels, as also the wheel, M^1—which drives one or other of them alternatively—have peculiarly shaped spiral teeth, which considerably reduce the transmission losses between the propeller-shaft and the differential. A ball-thrust bearing is fitted behind the bevel-wheel, M^1, and its shaft runs in a roller-bearing.

The wheels, P^3, form the reversing-gear, for either of them can be brought into mesh with the wheel, M^1, by the levers, P^1 and P^2, from the hand-lever, P^2, beside the driver, when the car is at rest. The differential-gear is of the spur-wheel type, and all its gear-wheels are of the true helical form; there are three pairs of planet wheels.

In this same illustration is seen the brake-band, Q^1, already referred to, and the drum upon which it acts; the drum is securely fixed to the shell of the differential.

The Steering Pillar.

The steering pillar, together with one half of the aluminium casing enclosing the steering gear, is shown in Fig. 17, as also are some of the separate parts. The pillar itself, S, is bolted to the aluminium casing, and down the centre of it passes the steel shaft, S^1, which carries the worm, S^2, at its lower end. All end play of this shaft is taken up by a lock-nutted set-screw, S^3, the end of which forms a centre pin for it. The worm meshes with the toothed segment, S^4, that is keyed to the shaft, S^5, and the shaft, S^6, passes through an eccentric bush, S^6, which can be locked to the casing in any position after it has been adjusted. The eccentric bush allows the shaft, S^5, to be moved towards or away from the worm, S^2, so that back-lash in the gear can be taken up. It will be noticed that the bush, S^6, has a conical flange at its one end, so that when it is drawn up tight and locked by the nuts, S^7, it is clutched tightly to the aluminium case. Owing to the fact that a steering gear of this kind is subject to most wear at the centre of the quadrant—because the car generally runs in a more or less straight direction—the makers have fixed the segment so that it is slightly eccentric to its shaft, and that, when new, there is a little back-lash when turning a sharp corner, but none when travelling in a straight line. The gear, therefore, tends to improve when in regular use, and it is always possible to take up the back-lash for running straight.

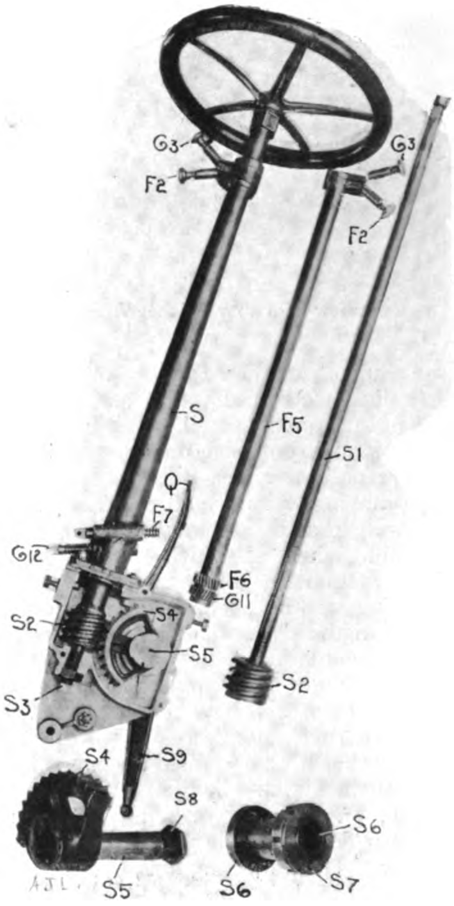


FIG. 17.—The Wilson-Pilcher Steering Gear and Steering Pillar, together with parts of them shown separately.

Passing down between the steering-pillar, S, and the shaft, S^1, are two telescoped tubes, the outer of which (F^5) is visible in Fig. 17. These tubes at their lower ends are fitted with the pinions, F^6 and G^{11}, and these pinions have their teeth cut at an angle to correspond with the rake of the steering pillar. The inner tube is fitted at the top with the hand-lever, G^3, and the outer one with the hand-lever, F^2, so that they can either of them be turned about their axis—it is these levers that regulate the normal speed of the engine and the time of ignition, as explained earlier in this article.

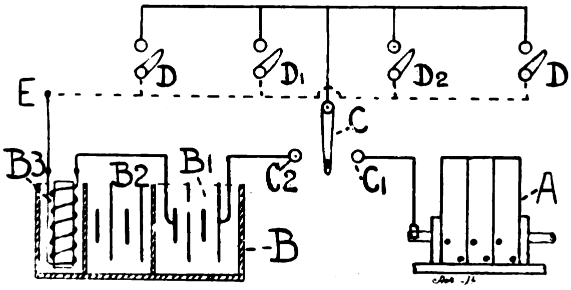
The hand-levers are fixed to their tubes in a very ingenious manner, and are themselves of somewhat interesting construction. They are so formed that they clip around the tube, but they are also keyed securely to it by thin sheets of steel, which are held in place where the lever fittings are slit through to render them flexible, and these steel plates project into corresponding slots in the tubes themselves. The levers engage with toothed-quadrants, which are not visible in Fig. 17, and have small cylindrical plungers which are normally held inwards by springs to engage with the quadrant teeth. The cylindrical plungers are turned with a taper at their inner ends to give a sharp edge, and it is these edges which engage with the teeth in the quadrant—each plunger engaging at two points. The plungers are quite free to turn round in their sockets, and this they do to a certain extent when being used. An enormous wearing surface is thus provided, and so there is very little likelihood of the levers ever failing to engage properly with the quadrants. The pitch of the teeth on the quadrants, of course, corresponds with the diameter of the plunger.

The pinions, F^6 and G^{11}, come into mesh with screw-threads formed on the sliding-rods, F^7 and G^{12} respectively, which are fitted horizontally through the pillar-casting, S. As the pinions are turned about their centres, when in place, they therefore cause the rods, F^7 and G^{12}, to travel longitudinally, the threads on these rods being equivalent to a toothed rack. The provision of a thread instead of a rack, however, gives the same advantage as that which we described recently in connection with the De Dion change-speed-gear, for it is only necessary to screw the rods inwards or outwards in order to adjust the hand-levers, F^2 and G^3, relatively to the mechanisms which they control.

THE "C.J.L." AUXILIARY IGNITION.

In order to be able to provide an auxiliary source of electrical energy for those whose cars are fitted with low-tension magnetos, and who consider a supplementary ignition set desirable, Messrs. Chas. Jarrott and Letts have brought out a very compact device consisting of two sets of accumulators and a special low-tension coil, contained in a box, which can be readily fitted to any car without structural alterations of any kind. This apparatus supplies the necessary current for the ordinary low-tension igniters.

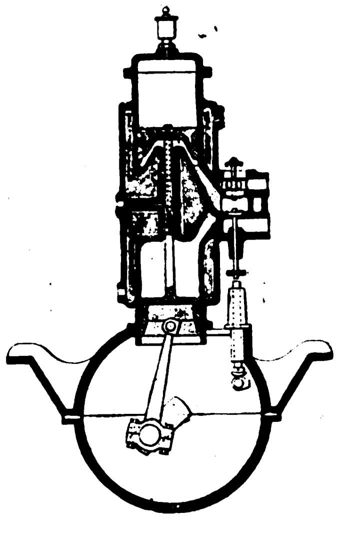
A diagrammatic arrangement of the connections for joining up the "C.J.L." ignition set is shown in Fig. 1, in which A is the ordinary magneto already in use, and B, the box containing the two-cell accumulators, B^1 and B^2 (one set being intended as a spare), and the special coil, B^3. A two-way switch, C, is placed in the circuit, and makes connection from the igniters. D, D^1, D^2, D^3, to either the magneto, which is joined to C^1, or to the "C.J.L." set which is joined to C^2. E shows the "earth" connection. The fact that such a supplementary ignition does not entail the additional fitting of high-tension spark plugs and coils should tell greatly in its favour with those who desire to possess a supplementary source of ignition on their car.



A DOUBLE-ACTING PETROL ENGINE.

Although it is open to question whether any high speed internal combustion engine would be altogether satisfactory if designed so as to be double acting, yet the engine of which we give a sectional drawing herewith is interesting. It is the invention of M. Bon, and is, we understand, at work in Lyons.

The cylinder casting forms two cylinders in line with one another, and the two pistons in them are rigidly coupled together by a rod which passes through a stuffing-box arranged between them. The design of the stuffing-box is unusual, and takes the form of a long cylinder of small diameter, in which an enlarged collar on the rod works as a piston. Leading into this tube is an oil feed, which not only serves to lubricate the stuffing-box but the main pistons also. Each cylinder has its own set of valves, which are operated in the usual way, and the explosion occurs in them alternately. The engine operates on the "Otto" cycle, so that in its single form two impulses are obtained during every alternate revolution.



Amongst the chief drawbacks that have hitherto been inherent in double-acting petrol engines of this and similar kinds are that the connecting-rod and its bearings are alternately placed in compression and in tension, and that it is necessary to employ some kind of stuffing-box for the piston rod to pass through.

The Harrow Council have decided to urge the Middlesex County Council to apply for powers under the Motor Car Act of 1903, to close Grove Hill against motor car traffic, in view of the fatal accidents which have occurred at this spot.

After mature deliberation and considerable opposition the A.C. of America formally decided on the 12th inst. to increase their membership from 400 to 500; 40 new applications were on the same day dealt with, three-quarters of these being elected to the club.

AN AUTOMATIC TYRE PUMP—THE "POMPEESI."

The "Pompeesi" is the name that has been given to an extremely convenient apparatus by which the engine on a car can be made to pump up the tyres when they have become deflated, the force of the explosions in one of the cylinders being employed for giving the necessary pressure for this purpose. The complete apparatus, fitted to a De Dietrich car, is seen in Fig. 1, and the apparatus itself, both complete and taken to pieces, is shown in Fig. 2. It consists primarily of a plug fitting, A, which is screwed through the wall of one of the cylinders, so that it communicates with the combustion chamber. This fitting is so made that it will fit into the same hole as an ordinary high-tension ignition plug, and, on such engines as it may be inconvenient to fix it elsewhere, it is intended to replace the ignition plug in this way; on the De Dietrich car, however, there are separate plug-holes which are made use of instead. The fitting, A, passes through another fitting, A^1, into the side of which the ignition-plug can be screwed, as seen in Fig. 2, and the plug is then still in open communication with the combustion chamber, although not quite so near it. It will be noticed that when the fitting, A, is tightened up, it makes a gas-tight joint between itself and the intermediate fitting, A^2, at the same time that it tightens the latter down against the cylinder casting, and that the ignition plug can be made to project in the most convenient direction. The top of the fitting, A, is adapted for connection to a coiled steel pipe, B, by the union cap, A^1, and inside the fitting, A, there is a small valve, A^4, the lift of which is limited by a nut, A^5, which is screwed into place, and is locked, immediately above it. The valve, A^4, allows the gases to pass from the combustion chamber to the pipe, B^1, but prevents them from returning past it.

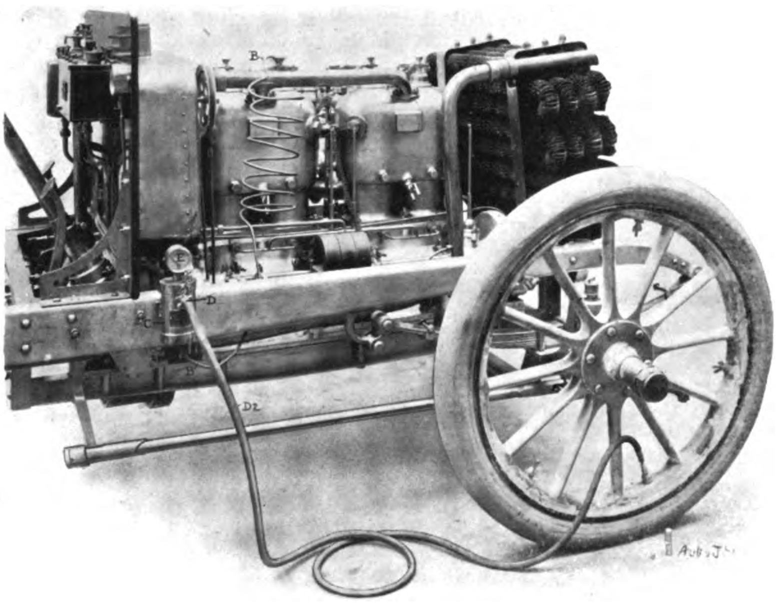


Fig. 1.—The "Pompeesi," fitted to a De Dietrich Car.

The pipe, C, is made of sufficient length to effectually cool the hot gases, passing through it, from the cylinder, before they reach the further end, and it is wound into a coil so that it may be easily led to any convenient point on the car that may be selected for fixing the other portion of the apparatus.

The pipe, B, is connected by the union, B^1, with the base, C^1, of the cylindrical chamber, C, which in Fig. 1 is fixed to the side of the frame near the dashboard. The chamber, C, not only forms a means for connecting the pipe, B, with a rubber pipe leading to either of the four tyres, but it also constitutes a very effective oil separator for catching any lubricating oil that might otherwise find its way through, and cause injury, to the tyres.

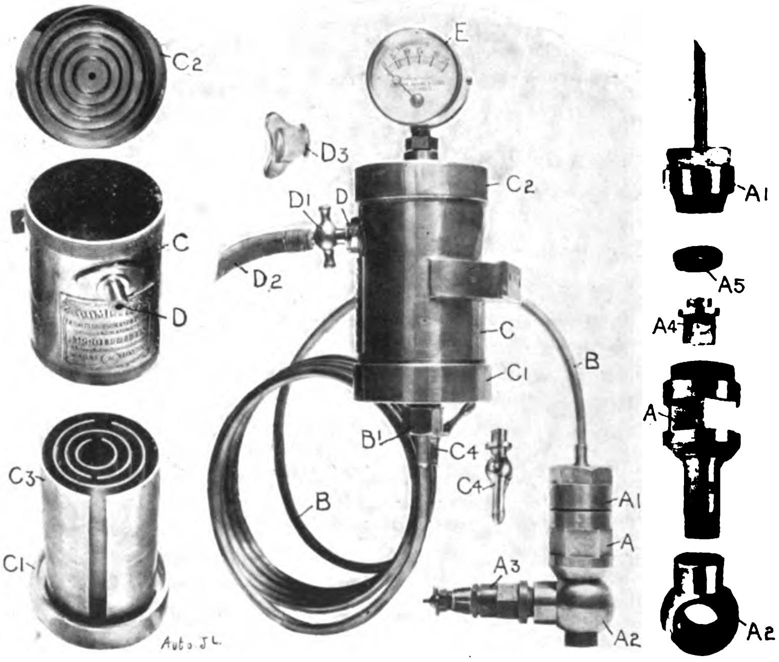


Fig. 2.—The "Pompeesi" Apparatus, complete and in parts.

Inside it are arranged concentric baffles, C^3, and to its wall is attached the nipple, D, to which the rubber tube, D^2, can be connected by the union, D^1. The cover, C^2, is fitted with a pressure gauge, E, and the base, C^1, with the drain-cock, C^4.

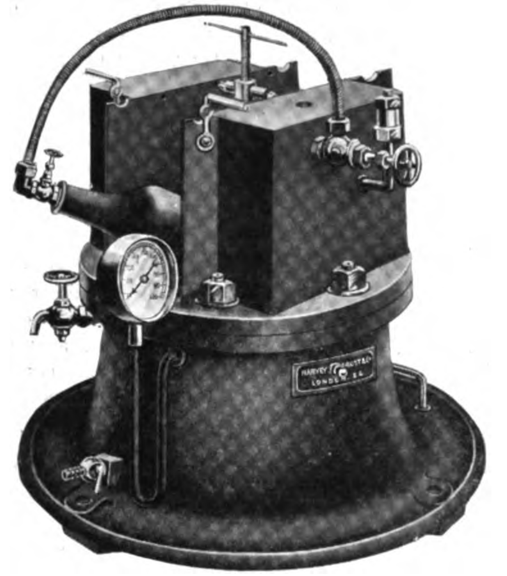
When it is necessary to inflate a tyre, the cap, D^3, is removed from the nipple, D, whilst the engine is at rest, and the rubber pipe is then used for connecting the chamber, C, with the tyre. The engine is then started, and the explosions occurring in the cylinder to which the apparatus is attached cause part of the products of combustion to pass at high pressure into the chamber, C, and into the tyre. The engine is allowed to run until the pressure indicated by the gauge, E, has risen to the desired point, when the engine may be stopped, the rubber pipe, D^2, removed, and the cap, D^3, replaced. After starting the engine again, the pressure in the chamber, C, is brought up to approximately the explosion pressure in the cylinder, but, since there is no exit from the chamber, the gases will soon cease to pass the non-return valve, A^4, in the fitting, A, at all. Any oil that may collect in the chamber, C, should be drained off by the cock, C^4, prior to using the apparatus.

This automatic tyre pump—which is being manufactured for Messrs. Charles Jarrott and Letts under special licence from the well-known French engineers, Messrs. Turcat-Mery—was awarded a gold medal by the Automobile Club of France in December last, and has proved itself to be a thoroughly practical and successful device. The time taken for inflating a tyre is about three minutes—usually varying from 2 mins. 45 secs. to 3 mins. 30 secs. on the De Dietrich car. Tests have been made to ascertain whether its employment is in any way injurious to the tyres, or whether there is any tendency towards partial deflation after it has been used. Apparently the substitution of the gases derived from the combustion chamber in place of ordinary air is beneficial to the rubber, rather than otherwise, and the gases are thoroughly cooled down to atmospheric temperature before they enter the tyre; this latter point having been proved by the fact that no fall in pressure was observable when a test was made after a tyre had been left inflated for twenty-four hours. We have no doubt that this apparatus will appeal to a very large number of automobilists, for it does seem absurd that a man should waste his strength in pumping up a tyre when he has available a very powerful engine, ready and willing to do the work.

THE "H.F." TYRE VULCANIZER.

That the cost of tyre upkeep is an expensive item all motorists will agree, so that any device which, while it reduces the cost of—and at the same expedites—repair, should receive some attention from all those interested in this matter. These advantages, together with the satisfactory repair of the tyre, are among the claims put forward for the "H.F." Steam Vulcanizing Plant, which has been put on the market by Messrs. Harvey, Frost and Co., and which we illustrate herewith. Briefly the device consists of a portable boiler, fired by a gas furnace fixed beneath it, while a specially shaped steam-chamber forms the upper part of the boiler. This steam-chamber constitutes primarily, a cradle in which the portion of the tyre to be repaired is placed. A hollow mandrel is placed inside the tyre, and is connected up to the boiler by a flexible steam-pipe. The correct temperature for vulcanization is obtained by raising the steam pressure in the boiler to a degree corresponding with the required temperature. It is claimed that the use of these mandrels enables the inside of the cover to be vulcanized simultaneously with the outside in a way which has hitherto been practically impossible with the "pan" process. For repairing cuts which are only superficial the "H.F." vulcanizer deals with the wheel intact, thus making it unnecessary to remove the tyre.

This apparatus is also adapted for dealing with the repair of inner tubes. For ordinary repairs the patch to be vulcanized is held down on the flat top of the steam chest by a small lever attachment, not shown in the illustration. A speciality is made of vulcanizing the valve *in situ* with this device; a closed tube is sunk into the top of the steam chest in order to accommodate the valve while being vulcanized in place. In order to enable the jointing of inner tubes to be effected in circular form, a hollow saddle is provided which, when in place and connected to the steam supply, forms, with the cradle, an enclosed jacket all round the tube—which is vulcanized in an inflated condition.



The "H.F." vulcanizer is both moderate in price and compact in form. It must not be forgotten, however, by those who undertake this class of work, that a good deal of care and special knowledge is necessary for successful vulcanizing.

The Secretary of De Dion Bouton, Limited, 10, Great Marlborough Street, Regent Street, writes us as follows:—"I frequently notice advertisements in the motor papers in which cars, fitted with De Dion Bouton motors only, are worded to represent them as De Dion Bouton cars. As such advertisements are evidently inserted to, and no doubt do, deceive the public, I shall be obliged if you will insert this letter to warn intending purchasers to make sure, before buying a car as a De Dion Bouton, that it is really our make throughout, and not merely fitted with a De Dion Bouton motor. We are always pleased to advise anyone on the subject if they will send us the number of the motor. This number is stamped on each half of the crank case on the right-hand side when facing the timing gear."

Four or five years ago the limited number of agencies where Pratt's Motor Spirit could be obtained throughout the country was a source of the gravest inconvenience to automobilists. A number of difficulties and prejudices have had to be overcome, and by degrees a very complete network of agencies has been established, so that it is now difficult to go into the smallest villages without finding at least one representative storing this very necessary "accessory." As the list is continually expanding, it would be as well for automobilists to obtain regularly from the Anglo American Oil Company, at 22, Billiter Street, E.C., a copy of their latest list of agents.

Mr. Ernest H. Arnott has resigned his position as manager of the Gladiator Company, and has joined, as sales manager, the Simms Manufacturing Company, Limited. Mr. Arnott, who intends to push the Simms specialities considerably, is arranging for marketing, in addition to the Simms-Welbeck cars, a new moderate-priced vehicle fitted with Simms engines and magnetic ignition, ranging in price from £150 for single cylinders, to £225 for 2 cylinder cars with tonneau bodies.

RACES, RECORDS, AND TRIALS.

GORDON-BENNETT ITEMS.

THERE will be eight controls in all on the Isle of Man Eliminating Course, as we announced previously. After the start from Quarter Bridge the first slow down will be at Ballasalla, the run of 1½ miles from there to Castletown, where the second control is established, being subject to moderate speed. At Foxdale Railway Bridge, where the bridge has to be passed under at a right angle, and which was illustrated by us on April 16th, the cars will be required to stop within indicated lines, and re-start. At Kirk Michael the cars will be controlled for half a mile, and at Ballaugh, where the course takes a right angle turn to the left, a stopping control is again established. At the next control, Ramsey, 4 minutes will be enforced. During this period cars will be allowed to fill up with water and petrol under observation. Upon approaching Douglas the cars are again controlled at Willaston Corner, where two sharp turns are taken after descending by the Snaefell Mountain Road. The cars are next stopped at Quarter Bridge, at the point where they originally were sent off from.

The first racing car will be sent off from this point at 9 a.m., on the morning of May 10th, and each of the other competitors will be dispatched in turn at intervals of 5 minutes, so that, assuming the whole 11 cars entered take their turn, the last car will depart at 9.55 a.m. Instead of letting each car cover the circuit a specified number of times, 8 hours gross will be allowed for the Trial, during which period each car will have to make as good running as possible, the object being to ascertain exactly what distance each car can cover, subject to the controls, in the specified time. Under this arrangement the car which starts at 9 a.m. will therefore be stopped at the first control which that car reaches after 5 p.m. wherever that may be. The second, starting at 9.5 a.m. in like manner, will be stopped at 5.5 p.m., and so on, until the last car has been brought to rest at 5.55 p.m., when the distance test will have been completed.

On the second day will be held the hill-climbing events. The point selected for this is at Maughold, on the coast-line, near Ramsey. Some good times should be attained here, as the road selected gives a good straight 1½-mile run, with fairly reasonable gradients, the worst being about 1 in 9 or 10.

The speed events on the Douglas Promenade will conclude the three days' meeting on May 12th.

Although the main centre of attraction in the Isle of Man will be the neighbourhood of Douglas, the Commissioners of Ramsey are in every way co-operating with the Douglas Town Council in making the Motor Race Week a big success. They are spending a fair amount in putting several of the roads at Ramsey into good condition, and altogether the goodwill exhibited by the authorities and the islanders is very marked. Regulations for the conduct of the races have been drawn up by the Highway Board of the island under the personal advice of the Lieutenant-Governor. Amongst other drastic clauses is one imposing a penalty of £20 on any unauthorised person invading the racecourse, the penalty extending also to any person's dog, ox, or other animal. These rules will be officially confirmed at the same time as the Act is promulgated at Tynwald Hill, St. John's, on May 5th. This ceremony is fixed for 11.15 a.m., when divine service in the church at St. John's will take place prior to the ancient form of promulgation by the procession of the Legislature and officials to Tynwald Mound, where the new law will be formally promulgated. The start of the racers at Quarter Bridge will be from the level towards Spring Valley, and the finish will be also on the level in front of a house, owned by Mrs. Fuller, on the Quarter Bridge Road, leading from Brae Hill. Stands are to be erected at this finishing point by the Douglas Corporation. Ample viewing space will also be available in the fields adjoining, which will also be under the control of the Corporation.

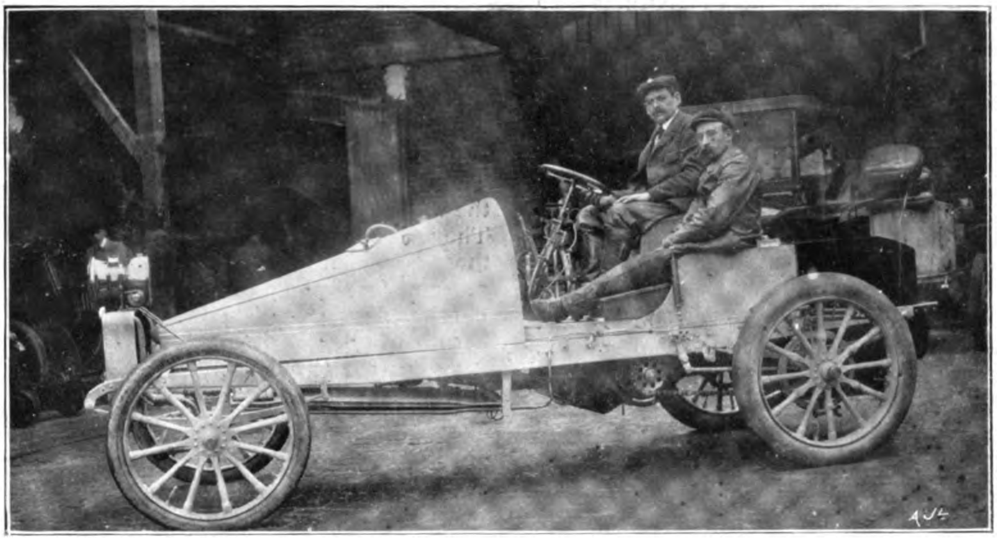
A splendid point from which to see the races will be Snaefell, if the weather be fine, the Keppel Gate being another good point. The electric cars, it has been arranged, will be running to Snaefell at all hours of the day, and no doubt will be very largely patronised both by the residents and visitors. To supplement the accommodation of the Bungalow Hotel at the top of Snaefell, the proprietor will erect a number of tents with sleeping accommodation, for those who desire to spend the night on the highlands ready for the morning's races. In several places sharp corners have been removed from the course, and in one case near Willaston corner, the road has been considerably widened. These improvements are not only of a temporary nature, but will be permanent alterations for the benefit of general traffic. For the safeguarding the course, yeoman farmers, their sons and assistants have been pressed into the service—at 5*s*. per head for the day, although we are a little bit doubtful of the wisdom of this selection, for to ensure absolute security, the functions of keeping the course should be confined more to men who are used to discipline and the keeping of order generally.

So as to avoid interfering with the Trials, both the Manx Northern and the Isle of Man Railway Companies have agreed to suspend all traffic after 9 a.m. on the day of the distance test. This has been found necessary as the course is intercepted at four separate points by the railway lines. A concession of this nature gives some idea as to how the different corporations, in addition to private individuals, are combining to make the event an unequivocal success.

The hotel accommodation in Douglas is both excellent and plentiful, and, in a proportionate degree, the same may be said of Ramsey. Although a large influx is expected to the island in connection with the Eliminating Trials, there should be no difficulty in finding good accommodation for all visitors. The announcements of several good hotels are included in our advertisement columns, and may be useful for reference by many of our readers who are crossing over before May 10th.

The Napier headquarters during the week preceding the Eliminating Trials in the Isle of Man will be at the Bay Hotel, Douglas.

Messrs. Hampton, of South Quay, Douglas, and Mr. Fred Gash, of 9, Castle Street, Douglas, have both arranged to have ample supplies of petrol and lubricating oils on hand for the Trials.



GORDON-BENNETT CUP RACE.—One of the Gardner-Serpollet Steam Cars, entered for the French Eliminating Trials. Mons. Pelzer, who will drive in the Trials, is at the wheel.

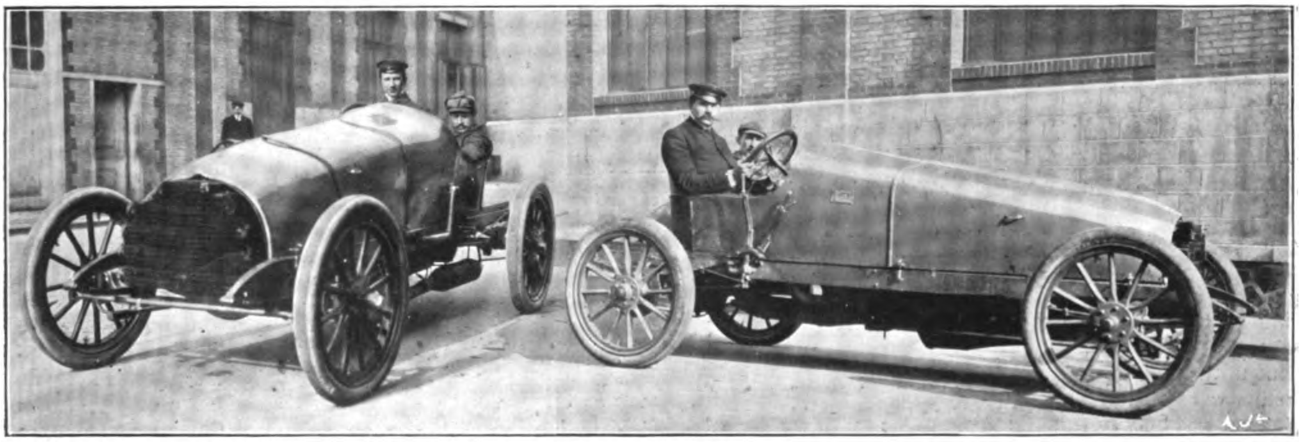
In consequence of extra controls being enforced by the French authorities, official timekeepers will be at a premium for the French Eliminating Trials, and in all probability, under these circumstances, some of the Belgian timing experts will be called into requisition.

Comparatively few particulars are available concerning the French competing vehicles, considerable reticence being shown by the various makers. It is interesting, however, to notice that, of the twenty-nine cars entered, eighteen are driven by side-chains, eight have a live axle system of transmission, and the remaining three—the Gardner-Serpollets—have a single, central, chain-drive to the back axle. The petrol cars are all fitted with 4-cylinder vertical engines, and the majority of the vehicles are fitted with ball-bearings to reduce the starting effort as far as possible, and enable the cars to get away quickly. They all have magneto-ignition except the Gobron. We understand that none of the racers weigh less than 800 kilogs., and that the lightest are the Georges Richard Brazier and the live-axle Clement-Bayard cars.

Concerning the Panhard cars, the makers have adopted a live-axle system of transmission, although we understand that chain-driven cars have also been built in reserve.

Two of the Clement-Bayard vehicles are of the live-axle type, and these have 70-h.p. engines, the bore of which is 155 mm. and the stroke 160. It is these lighter cars which are to be driven by Messrs. A. Clement, jun., and Hanriot. The larger car has side-chains, and this is fitted with an engine of 100 to 120-h.p. This car, however, which will weigh close on the full 1,000 kilogs., is not yet finished, and may not be ready in time. The appearance of the lighter Bayard racers is shown in an accompanying illustration.

The Serpollet cars, one of which is shown in another of our illustrations, are fitted with 6-cylinder engines, which are nominally of 50-h.p., but can, we understand, develop about 150-h.p. The makers have followed previous practice to a considerable extent in the construction of the chassis, and the live-axle is driven by a single chain.



GORDON-BENNETT CUP RACE.—Two of the Clement-Bayard Cars which will participate in the French Eliminating Trials on May 20th. M. Clement fils is on the 80-h-p. racer to the left, and M. Hanriot is on the sister car to the right.

The Darracq racers are so identical in appearance to those built in England, of which we gave a full illustrative description last week, that we have nothing further to add concerning them, and it is unnecessary to reproduce the photographs of them which we have received from France. The horse-power is given as 80, and the weight as but little over 800 kilogs.

For the French Eliminating Trials taking place on May 20th, a special train is to be run by *L'Auto*, which will occupy a minimum of time—in all about 24 hours—for those who are desirous of witnessing the race, and returning immediately after the event. Under the arrangements, the train will leave Paris on May 19th at 7.30 p.m., and will be so arranged as to serve within easy distance of every point of importance on the course. The return journey will be on May 20th, starting from Vouziers at 6.30 p.m., reaching Paris at 10.20.

Amongst the American racers that have been built for taking part in competition, we are able to give a few particulars concerning the Peerless car. It has a 4-cylinder engine in which the cylinders are formed by a single casting, and each of these has three automatic inlet-valves fitted in the head. The cylinders are vertical, and the ignition-plugs are fixed centrally above them. The change-speed-gear gives four speeds and a reverse, the wheel base is 8 ft. 8 ins., and the track is 4 ft. 6 ins. The tyres on the rear wheels are 36 ins. by 4½ ins., and those on the front wheels are 34 ins. by 3½ ins. The radiator, for cooling the circulating water, is formed by copper tubes, which are led along from the front to the back beneath the frame.

Dr. J. Von Marx, the Oberbürgermeister of Homburg, has notified the A.C.C.B.I. that a room has been reserved in the Homburg Kurhaus for the use of members of the club.

A 2,000 MILES "NON STOP" RUN.

Mr. Cecil Edge, at the stroke of 12 midnight on Saturday last, started with his 15-h.p. Napier car on his 2,000 miles run in 100 hours, from New Burlington Street to the Automobile Club, Piccadilly, *via* Land's End, John o' Groat's, and Brighton. Those accompanying Mr. Edge were Mr. F. G. Cundy, who, when necessary, took turns at the wheel, and Mr. Douglas Miller of the *Referee*. Elaborate arrangements were made for the supply of the necessary petrol and other requirements for the journey *en route*, these being in all cases taken on board whilst moving. The itinerary was mapped out as follows :—*Sunday*, Exeter, Land's End, back to Penzance, Taunton ; *Monday*, Worcester, Warrington, Kendal, Carlisle, Lanark, Perth ; *Tuesday*, Inverness, Wick, John o' Groat's, back to Wick, Inverness, and Perth ; *Wednesday*, Carlisle, Kendal, Warrington, Nantwich, Lichfield, Coventry, and London ; *Thursday*, Brighton, Worthing, back to Brighton, and then to the Automobile Club, Piccadilly, where the car was timed to reach at 6 a.m.

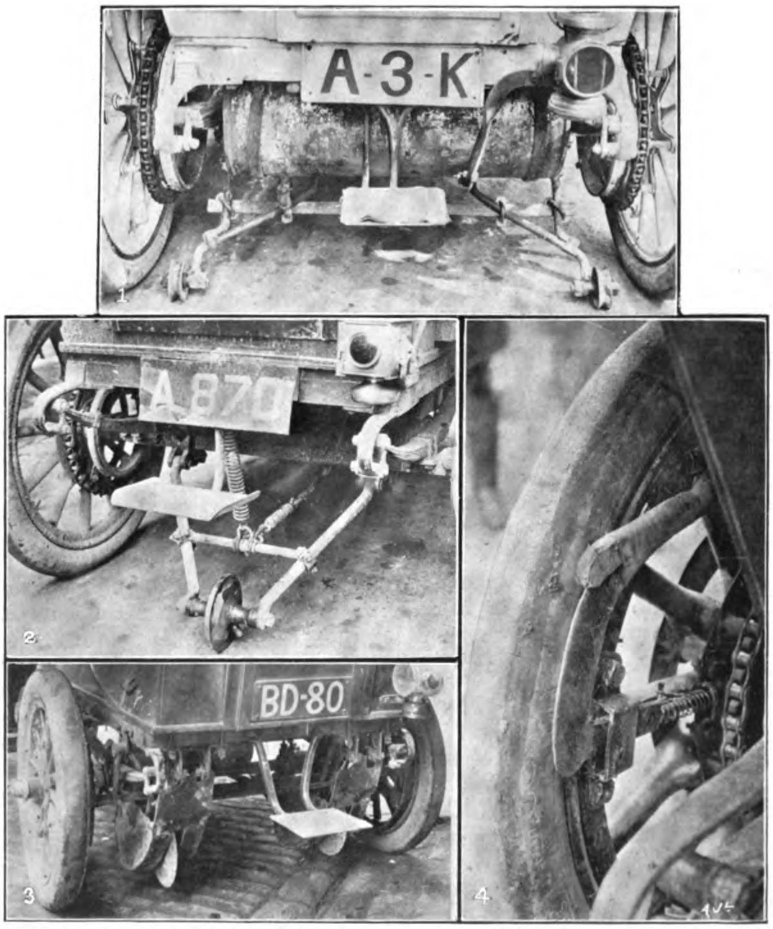
THE 2,000 MILES CONTINUOUS RUN.—Mr. Cecil Edge on the 15-h.p. Napier, just prior to his start. His travelling companions are Messrs. F. G. Cundy and Douglas Miller.

Mr. Cecil Edge may claim to have performed one of the most remarkable feats recorded to date in connection with automobilism. The anticipated times of reaching the various points on the outward journey has not only been kept, but until the Grampians were reached the car was between two and three hours ahead of the times announced. Land's End was reached two hours in advance of time, and Exeter 2½ hours, the journey being accomplished without a stop of any sort, and fortunately in fine weather. From Bristol forward the weather changed for the worse, but in spite of this Warrington was safely passed and Kendal reached on Monday half an hour in front of time. Perth showed 1 hour and 40 minutes to the good, and still a non-stop run. Crossing the Grampians during the night a cold head wind was experienced, accompanied by storms of sleet and snow, the roads being consequently in a terrible condition. The time in hand was, therefore, under these circumstances lost, but Mr. Edge managed to arrive at John O'Groat's at 11.45 on Tuesday, about 1¾ hours under the schedule time. Up to this point the distance covered was 1,091½ miles in 54 hours, non-stop engine run, the gross time from Land's End to John O'Groat's being 45½ hours, net 39 hours, with the weather and roads as bad as they could be during the latter part of the run, the mishaps up to this point being two punctures and a broken chain. On the southward journey Wick was reached at 2 o'clock on the same day, the weather still remaining bad, Inverness at 4.30 a.m. on Wednesday, about 12 hours late, a bad time being then experienced on recrossing the Grampians. From here, however, forward the Napier car plodded along steadily on its journey to London, it being expected to reach Burlington Street between 8 and 9 on Thursday morning. From there the programme of the run was to Brighton and Worthing and back to the Automobile Club in Piccadilly, which was expected to be reached between 3 and 6 in the afternoon of the same day.

SIDE-SLIP TRIALS OF THE A.C.G.B.I.

SIDE-SLIP TRIALS OF THE A.C.G.B.I.—The competitors prior to the start on the Three Days' Test through the Midlands, on Thursday the 21st inst.

THE endurance tests of the side-slip competition organised by the A.C.G.B.I. finished on Monday last, on which day the cars made the particularly trying run to Slough, Beaconsfield, and back, taking the 48 miles of tram lines *en route*. Only two competitors have abandoned the contest through trouble with their non-skid devices. One of these was the "Crown," entered by W. Jenkinson and Co., and the other was the Edwards device, which was withdrawn, we understand, through the car which was originally entered having broken down before the event. New covers to fit a smaller car were hurriedly put in hand and completed in three hours, and these, not unnaturally, gave way during the actual test owing to their hurried construction. It would appear as if the fates themselves were acting against the Vivian device. In our last issue, in which we described the majority of the competing devices, we chronicled the accident to the car fitted with the Vivian tyres, in which the engine broke her crank-shaft and kept the car out on the road all night. Returning from Nottingham on Saturday, the same car was overturned by a dog, and some of the occupants sustained injuries. Nothing daunted, a new car was at once sent on which to fit the undamaged tyres—over which the vigilant observer had kept constant watch—and the remainder of the journey was successfully accomplished.



THE ANTI-SKID TRIALS OF THE A.C.G.B.I.—The Mechanical Devices:—1. The Rourke and Horsborough. 2. The Cavendish. 3. The Hunt. 4. The Nicholson.

The side-slip endurance trials for cycles, which were held simultaneously for four days with those of the cars, started on their endurance tests on Thursday, April 14th, since when they followed the cars on their daily routes. Each cycle was assigned to the observation of a car. With the exception of Mr. Bentley Tollemache's, all the devices entered for these trials turned up at the start. These comprised the entries of

Mr. Maitland Edwards, Mr. W. Hayes, Messrs. Parsons, Wilkinson, W. Bates, the main points of their devices being enumerated in our issue of April 2nd, 1904.

On Monday last, the 25th inst., those cars in which the side-slip preventer is put into operation by the driver, at will, joined the other competitors in the run to Slough, &c. These devices were entered by Messrs. H. S. H. Cavendish, W. Hunt, Rourke and Horsborough, and Alex. Nicholson. With the exception of the last, all are independent of the road wheel, and consist of either one or two discs trailing on the ground behind the back axle, the devices being drawn up out of contact with the road when the weather is such as to render the precaution of having them in action unnecessary. The following is a short description of these arrangements:—

Fig. 4 is the device entered by Mr. Alex. Nicholson. This is attached only to the inside of the rear wheels, which leaves the outside quite free from unsightly obstructions. On each wheel are three scythe-shaped blades, which are hinged in small dust-proof bearings carried on the felloes. When in action a spring, arranged for the purpose, causes each blade to come into contact with the road as the wheel revolves, a small pad of rubber being also fitted to deaden the noise. When not required, a hand-lever in front is operated, and this, actuating through a chain, draws inwards, simultaneously, each of the blades, the free ends of which are attached to a sliding sleeve on the back axle by chains. When in this position the friction surfaces are only those between the revolving sleeves and the stationary collars, which engage with them. When in their operative position there is no pressure on these rubbing surfaces.

The Cavendish device, which we illustrate in Fig. 2, consists of a single disc running centrally under the back of the car behind the rear axle. This disc is carried by a frame, which is normally held off the ground by the action of a spring. For putting this device into operation, a hand-lever is caused to overcome the upward pull of the first spring. The hand-lever, however, also acts through a strong spring, which allows the running disc to follow the contour of the road.

The pair of discs, notched on their peripheries, which constitute the device entered by Mr. W. Hunt (Fig. 3), are also normally held out of action by a spring. In this case, however, the brackets which carry the discs are stationary and are provided with curved slots in which slide the bearings carrying the discs. The device, as will be seen from our illustration, is almost entirely covered in as a protection from the mud.

In the Rourke and Horsborough device, illustrated in Fig. 1, two small grooved wheels are used, these being quite small compared with the other devices of a similar character. Contrary to the principle adopted by Messrs. Cavendish and Hunt the hand-lever in this case is only used to raise the hinged frame, carrying the small wheels, to a position in which they are no longer in contact with the ground, where they are otherwise held by the action of a spring.

* * *

The Glasgow-London Run.—One further entry for this run has been made under the special conditions of Rule 13. This entry is of a 12–16-h.p. Renfrew car, No. 30 on the list, entered by the Scottish Garage Company, Limited, of 96, Renfrew Street, Glasgow. This car is of French make, with a 4-cylinder Mutel motor, of which the entering firm are the importers and agents.

Full permission has been given by the French authorities for the speed events connected with the Arras Exhibition to be held next month. The dates fixed are: May 25, standing mile and flying kilometre on the Arras-Douai road; May 26, one-kilometre hill climb on the Doullens Hill.—For this event Baron de Caters proposes to offer a special cup for competition; May 27, five-kilometre road race, standing start; May 28, tourist run from Arras to Boulogne and Touquet. It is hoped that in some of these events several of the cars built for the Gordon-Bennett race will be seen.

On May 15th the A.C. of Marseilles have arranged for a consumption trial for tourist vehicles.

It has been decided by the Bavarian Automobile Club that the competition for the Herkomer Cup shall be postponed until next year, mainly owing to the overpowering interest which is being taken in Germany in the Gordon-Bennett Cup race. Professor Herkomer, the donor of this Cup, is shortly taking delivery of a 28–36-h.p. Daimler car built by the Daimler Motor Company, of Coventry.

The Bordeaux Sports Week, commencing on May 8th with motor boat races, will include on the subsequent days a tourist competition (two days), an aeronautical exhibition and competitions connected therewith, the last two days, May 13th and 14th, being devoted to trials for heavy vehicles, delivery vans, and public service automobiles.

Owing to the exceptionally bad weather the Nice-Rome Tourist Run has not attained the success which it deserved. Only five competitors started on the trip, and of these practically all of them abandoned the trial at an early stage. The most interesting portion of the trial took place on the first and second days, when consumptions were measured and tests for brakes and hill climbing powers were held. The steering capabilities of the various cars were also tested under severe conditions. Only two completed the run to Rome, viz., M. Challanson (Krieger car) and M. Meuue (Germain).

In connection with the Vienna Alcohol Exhibition, which was formally inaugurated at the end of last week, there will be three important competitions in which alcohol only will be permitted to be used as fuel. The first will be a fuel consumption trial, the second a hill-climb, over a distance of 4.2 kiloms. on the Exelberg Hill, and the third an industrial vehicle competition over courses of 50 and 75 kiloms.

Boston Hill Climb (Commonwealth Avenue).—Last week Bowden, on a Mercedes car, and Hills, on a Richard-Brasier light car, tied with 15$\frac{2}{5}$ secs. for this event over a distance of $\frac{1}{8}$-mile on the Commonwealth Hill. A 6-h.p. Stanley steam car made next best time in 16$\frac{3}{5}$ secs.

Under favourable conditions the Commercial Vehicle Trials of the A.C. of America were continued during the week ending April 9th. Of the 17 original starters 15 successfully came through the six days' tests, the two competitors who abandoned the contest being, as we mentioned last week, the Carlson (which was only completed the morning before the contest started) and the Commercial Company's steam truck. We published on page 503 the list of those taking part in the trial, and now await the publication of the official report and data. The event must be regarded as a success, as about half the vehicles were of new design, and competed for the first time in a public test. Several were rushed through towards the finish, and suffered therefore from several minor defects which with more time would have been non-existent.

The National Cyclists' Union, after long deliberation, has decided not to allow, for the present, at all events, motor pacing in open amateur races.

Barney Oldfield has done severe penance and purged himself of his contempt of the racing rules of the American Automobile Association. In consequence, his disqualification has been rescinded, a fine of 500 dollars being substituted by way of a caution. Oldfield may therefore still be seen driving in the American team for the Gordon-Bennett Cup race.

Motor boating in Norfolk will open for the season at Oulton Broad, on Whit Monday, when, at the Regatta, amongst other events is one for motor boats not exceeding 30 feet over all, under Marine Motor Association rules. A fair number of entries have already been received, so there should be some good sport provided. A trophy has been presented by Mr. Maudsley Brooke, which it is hoped will bring forward a good entry each year.

In America the American Automobile Association have boldly taken a plunge in regard to controlling racing motor boats. For some time feeling has been somewhat high between this body and the American Power Boat Association as to which should be the controlling body in this matter. Following the step now taken by the A.A.A., who have issued an elaborate set of rules, no doubt a certain amount of friction will arise with the other Association. This latter body at present claims to be responsible for issuing licences for holding high-speed launch racing events. They have recently sanctioned sixteen different meetings during the season, commencing on May 30th, and it remains therefore to be seen, if some *modus vivendi* is not arranged, under which banner the rapidly-growing number of racing men adopting this form of sport will range themselves.

Paris-Bordeaux-Paris Motor Bicycle Trial.—On Friday, April 22nd, this endurance contest for tourist motor bicycles from Paris to Bordeaux and back, a total distance of 1,200 kilometres, run in four stages, was started. Sixty-five entries were received, and 60 machines actually started. The first stage of the run was to Tours (258 kiloms.), the second to Bordeaux (342 kiloms.), the third and fourth being occupied by the return journey over the same route.

There were two categories, viz., for one-seated and two-seated vehicles, the latter including machines with either fore-carriage or trailer, but having no differential. A maximum cylinder capacity of 333 cub. cent. was permitted for machines in the first class, and 500 cub. cent. for the second, no weight limit being enforced. The motors, carburettors, frames, forks, and hubs were marked by the judges, and changing these without notification led to disqualification. For the entire run 230 points were allotted, 200 being for endurance and 30 for hill-climbing. A diploma and a gold medal was offered to each machine securing not less than 175 points, and a second class diploma and a silver medal for 125 points. Each manufacturer was only allowed to enter three machines, divided between the two classes.

The 60 starters from the Bois de Vincennes, Paris, on the Friday at 6 a.m. were sent off in pairs at minute intervals. The first stage to Tours disposed of 12 of these, 48 starting on the second day's journey—arriving at Bordeaux. During the latter part of the run to this point heavy rain was falling and the roads were churned into a bad condition. Sunday was reserved for a rest and the display of the competing machines to the public at the Alhambra Hall. On Monday last the start for the first stage of the return journey was made at 6 a.m. from the Quatre Pavillons, the journey to Paris being again broken at the halfway point, Tours.

Thirty-one competitors were officially timed away from Bordeaux, from which point a number of the riders appear to have practically ignored the speed and control rules. In fact, in several cases it had by this time resolved itself into a speed contest pure and simple. Osmont, in this respect, will probably be disqualified. Twenty-five reached Tours officially on Monday, and for the last stage 28 started for Paris on Tuesday, 23 being timed at the finish.

AERONAUTICS.

Appropriately enough, after the recent appearance of M. Santos Dumont's book, "My Airships," we are able to announce that he is resuming his experiments at his airship station near Paris. The first operations, we understand, consist of a resumption of trials with No. 7. As at present arranged, this airship has a hull of 30 metres in length, with a propeller, of 4 metres in diameter, at each end. The 4-cylinder motor for driving it is mounted below the hull in a wooden case, and drives the two propellers by a vertical shaft and bevel gearing connected to each of the propeller shafts. The object of arranging the motor below the hull proper—it is some 8 metres below the horizontal line joining the two propellers—is to avoid all possible danger of the gas in the gas vessel being ignited by the motor. At the same time, while experiments are being resumed with No. 7, the completion of No. 11 is being proceeded with, and the hull is practically ready to be attached to the gas vessel which is being completed by Messrs. Lachambre. M. Santos Dumont anticipates being ready to experiment with this airship in the early days of May, and has calculated that he will be able to attain a speed of a little over 30 miles an hour in still air. As soon as M. Dumont has familiarised himself with the working of No. 11, he intends starting for St. Louis with it.

At the same time M. Archdeacon is continuing his experiments in free flight at Berck-sur-Mer. He is very satisfied with the mastery which M. Voissins has obtained over the machine, and it is evidently anticipated that free flights for some considerable distance will be effected in the near future, although the 25 metres free flight already recorded does not appear to have been exceeded. As we stated in a former issue, Capt. Ferber has been giving the experimenters the benefit of his experience in free flight, and under his supervision certain alterations are being made in the machine. The bars or ribs at the rear have given trouble through being too convex in shape, and they are now being flattened off. M. Archdeacon is, accordingly, having a second aeroplane (embodying the results of the experience already gained) built for him, and feels quite convinced that with it he will be successful in equalling the results obtained by the Brothers Wright. We sincerely hope so. It would be far from satisfactory if the aeroplane should turn out to be a machine with which nobody but Wilbur and Orville Wright can fly.

The International Commission on Scientific Aeronautics is to hold its meetings at St. Petersburg from the 29th of August to the 3rd of September at the Imperial Academy of Science.

The Aeronautical Institute, which from time to time arranges competitions designed to promote either directly or indirectly the progress of aerial navigation, is arranging to carry out a number of propeller experiments for the purpose of providing data in regard to the best shape and pitch. The size is to be provisionally limited to four feet in diameter, and the Aeronautical Institute will provide a ½-h.p. motor for driving them. The propellers are to be tested by attaching them to the motor mounted on a carriage of known weight, the whole being arranged to be driven along wires or rails. In this way the varying draw-bar pull produced by different types at various speeds can be estimated. A sub-committee of the Institute has been appointed to organise the competitions, and a nominal entrance fee of 2*s.* 6*d.* or 5*s.* will be charged.

The general increase in interest in aeronautics is well shown by the manner in which M. Archdeacon's spirited attempt to emulate the successes of the Wright Brothers has provoked friendly rivalry in Belgium. Dr. Edouard Sury has been making some glides in the neighbourhood of Spa with an aeroplane of somewhat similar construction to that of the Brothers Wright and M. Archdeacon.

Some modification has been made in the rules governing the aeronautical contests taking place in connection with the St. Louis World's Exposition. A full summary of the original rules were published by us as long ago as January, 1903. The only changes of importance now made are as follows:—

The minimum speed requirement in the contest for the grand prize of 100,000 dollars has been reduced to 30 kiloms. (18¾ miles) per hour, instead of 32 kiloms. (20 miles) per hour.

Formal entry for any of the contests may be made as late as June 1st, instead of May 1st, 1904.

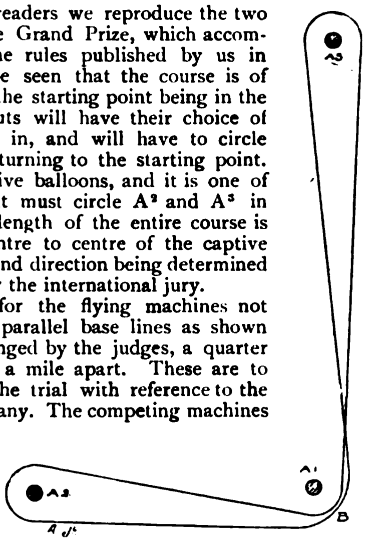
The prize for the highest altitude attained is withdrawn, on account of the great danger attending such contests, without any adequate motive.

The races with spherical balloons, provided for in the supplementary rules issued in August, 1903, will be reduced to eight in number, instead of ten; and will begin on the first Monday in June, instead of May. There will, therefore, be no races in May.

Prizes of cups, medals, or other trophies will be offered for spherical balloon races between amateurs, to take place the second and fourth Mondays in September.

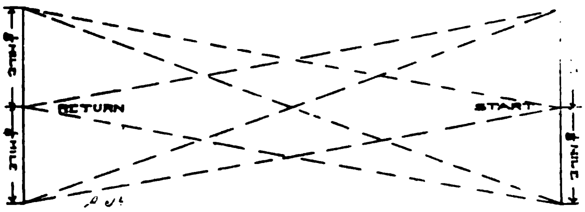
Hydrogen gas of the best quality will be provided free of charge for all entering the contests.

For the benefit of our readers we reproduce the two plans of the course for the Grand Prize, which accompanied the summary of the rules published by us in January, 1903. It will be seen that the course is of the shape of the letter L, the starting point being in the angle at B. The aeronauts will have their choice of which direction they start in, and will have to circle round both A^2 and A^3, returning to the starting point. A^1, A^2, and A^3 are captive balloons, and it is one of the rules that the aeronaut must circle A^2 and A^3 in opposite directions. The length of the entire course is 10 miles reckoned from centre to centre of the captive balloons, the exact length and direction being determined and accurately measured by the international jury.



As regards the course for the flying machines not carrying a passenger, two parallel base lines as shown in the diagram will be arranged by the judges, a quarter of a mile long and at least a mile apart. These are to be laid out on the day of the trial with reference to the prevailing wind, if there is any. The competing machines will then be started from the centre of the leeward base line and proceed at right angles to it. On crossing the other base line they may be caught and started back again, proceeding down the wind and crossing the other base line in the manner indicated.

It will be remembered by our readers that one of the conditions for entering the competition is that each competitor must bring forward evidence of having previously made a flight of at least a mile course and return. At the present date this would seem to exclude practically all competitors but M. Santos Dumont and the navigators of the Lebaudy Airship. Whether others will before next June have accomplished the required feat, so as to be in a position to enter for the competition, yet remains to be seen.



DR. GRETH, whose first airship experiments were referred to a few months ago, is intending to compete for the St. Louis prize, and he is said to have made another ascent near San Francisco to a height of 1,000 feet, to have travelled 4 miles, and to have successfully steered the machine in several directions, making a successful landing. It does not appear that the airship returned to the starting point, though the successful landing is an improvement, as our readers will remember that on the former occasion it "landed" in the sea.

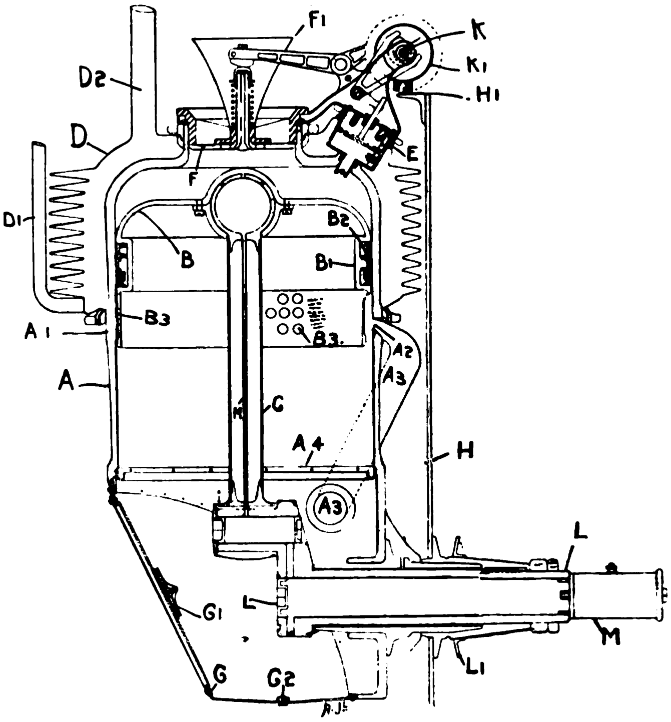
AT the General Meeting of the Aeronautical Institute, held in St. Bride's Foundation Institute, on Wednesday, 20th April, Dr. F. A. Barton in the chair, Mr. H. E. von Holtorp read a paper entitled "A Light Internal Combustion Motor for Aeronautical Purposes."

In describing his motor, which is, we understand, about to be built for actual experiment, Mr. von Holtorp said that in his design he had aimed at practically only one object, viz., extreme lightness in proportion to power. To attain this end would, of course, increase the expense of construction on account of the excessive amount of machining necessary to reduce all the parts to exactly the required thicknesses; but he thought this would be no very serious drawback in the eyes of the aeronaut. In the matter of durability, too, Mr. von Holtorp suggested that this was quite of secondary importance, provided that the engine was entirely satisfactory while it lasted.

The theoretical considerations, which he considered important as being conducive to the end he had in view, were enumerated as follows:—High speed, high angular velocity, extreme lightness of reciprocating parts, internal heat to be kept as high as possible, high compression, adequate lubrication, scavenging of cylinder, mechanical action of valves.

Mr. von Holtorp then went on to explain his design in detail, referring as he did so to the sectional drawing (chiefly diagrammatic) which we herewith reproduce.

A single steel stamping, A, forms at once the cylinder and cylinder head, and also one wall of the crank-chamber, the remaining walls being of sheet aluminium. In the cylinder, G, works a comparatively short trunk piston, B, which is also stamped out of steel. To accommodate the cast-iron piston rings, B^2, a recess, B^1, is spun into the piston walls, while for lightness sake the tail end of the piston is profusely drilled with holes, B^3, only a few of which are shown in the illustration. Instead of being fitted with an ordinary gudgeon pin, the small end of the tubular nickel steel connecting-rod, C, is made spherical, and this forms a ball and socket joint in the cup seating stamped out in the centre of the piston head. The cooling of the cylinder is arranged for by a corrugated water jacket, D, the inlet pipe, D^1, to this entering at the bottom, while the outlet pipe, D^2, through which the water is intended to pass as steam, is situated at the top. A radiator, or more correctly, a condenser, is of course fitted elsewhere to condense the steam.



This engine is intended to work with a positive injection of petrol from the lower side of the small diaphragm pump, E, which takes its supply from the tank through a ball valve. Only one valve, F, is used for the inlet and exhaust, and this is situated directly in the centre of the cylinder head, and is mechanically operated.

On the suction stroke, this valve, F, is opened, and admits pure air, which is compressed on the succeeding return stroke of the piston. At the right instant the pump, F, is caused to inject the required petrol, and the mixture is then fired in the usual way, although it is hoped to secure spontaneous combustion—as on the Diesel engine—after suitable experiments have been carried out.

At the end of the working stroke the piston uncovers a row of ports, A^1, which are drilled in the cylinder walls, and some of the exhaust gases escape to the atmosphere through them. The uncovering of similar holes, A^2, on the other side of the cylinder admits a scavenging jet of cold air, which has been previously compressed for this purpose in the crank chamber, and passes to the cylinder through the pipe, A^3. The returning up stroke of the piston clears out the exhaust into the atmosphere through the valve, F, which remains open until the end of the succeeding suction stroke when it is allowed to close. A baffle, F^1, is fitted round the valve stem in order to protect it from the heat of the exhaust gases.

The inlet to the crank-chamber is through the clack valve G^1, which opens inwards during the up strokes of the piston.

The flywheel, H, is formed of a thin steel disc, which is securely fixed to the crank-shaft, L. The crank-shaft itself has a single bearing provided in the steel wall of the crank-chamber, the crank being of the overhung type. On the flanged rim of the flywheel is formed a multi-threaded worm, which engages with a small wheel, K^1, on the cam-shaft, K, the gear ratio being 2 to 1 as usual. On the cam-shaft are three cams, one operating the valve, F, another the pump, E, and the third forming a contact cam for the ignition.

Lubrication of the crank-shaft and crank is effected from the inside, by the lubricator, M, on the free end of the shaft. From the crank, the oil finds its way up a small pipe, M^1, to the hollow connecting rod head, where it lubricates the ball and socket-joint.

For lubricating the cylinder, oil is injected through pipes—not shown in the illustration—which are in communication with the upper side of the pump chamber, E, this side being used as an oil pump. A small oil trough, A^4, is fitted round the bottom of the cylinder to collect the oil, and into this the end of the piston dips at the end of each down stroke.

Such waste oil as may be collected in the crank-chamber is intended to be ejected through the small plug, G^2, which has only to be raised for this purpose.

The transmission of power is intended to be by rope from the pulley, L^1, but this, of course, may be altered to suit any special requirements.

We understand that Mr. von Holtorp intends to run his motor when made at about 4,000 revs. per min., and that the weight of the finished engine is expected to be about 5 lbs. per horse-power. It is also intended to experiment with kerosene as fuel.

The next meeting for balloon ascents of the Aero Club will be held at the Crystal Palace on May 7th at 2.30 p.m. Another ascent will take place at the Palace on May 19th.

"INTERNAL COMBUSTION MOTORS."

By Dugald Clerk, M. Inst. C.E.*

The lecturer commenced by giving a brief review of what had been accomplished during the past twenty-five years in the development of internal combustion engines of all kinds, ranging from the ½-h.p. motor to the 2,000-h.p. engine, and referred to the great variety of fuels which had been successfully used for them. He pointed out that in this work the engineer has met with all manner of difficulties—mechanical, physical, and chemical—but that he had overcome many of them and had skilfully evaded others. Laying emphasis on the fact that although much has been done in this direction, still more remains to be done, he stated that his intention was, in this lecture, rather to indicate the lines that should be followed for future progress than to describe past achievements. In order, however, to appreciate from the past history the probable line of future progress, he deemed it desirable to say something as to what had been done, pointing out that a considerable amount of knowledge is now available in connection with motors of this kind, and that they are undoubtedly better understood to-day than at any previous time, so that many old fallacies have disappeared, even if some new ones have taken their place. A good deal of difference of opinion exists on physical and chemical points of very grave importance, but there is a general agreement, so far as practice goes, on certain main features—these leading features being initial compression of the working fluid, exposure of the flame to the smallest area of cooling surface for the shortest time, and the use of the lowest flame temperatures consistent with high available pressures. In many cases motors deviate somewhat from these understood requirements, generally not from ignorance on the part of the designers, but from some stern practical necessity. He intended to discuss some of these matters, both practical and scientific.

Continuing, he said that development has followed two main lines. First, improvements relating to the motor itself, including changes in the thermo-dynamic cycle, followed, in the treatment of the working fluid and the inflammable gas within the motor, by the

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* The "James Forrest" Lecture, 1904, read before the Institution of Civil Engineers, on April 21st.

TABLE I.—HEAT BALANCE SHEET FROM 1882 TO 1900, WITH OTHER PARTICULARS OF ENGINES.

Experimenter and Year.	Engine Dimensions.		Revs. per Minute.	Compression.	Expansion.	$\frac{1}{r}$	E Standard Air-cycle.	Heat Proportions.					$\frac{\text{I.H.P.}}{\text{E}}$	Heating Value of Gas Taken.	Type of Engine.
	Diam. ins.	Stroke. ins.						I.H.P.	Rejected in Water Circulation.	Rejected in Exhaust.	Difference Values.	Total.			
Slaby, 1882 ...	6·75 ×	13·7	160	PV^1	$PV^{1.37}$	$\frac{1}{2·66}$	0·33	0·16	0·51	0·31	0·02*	1·00	0·48	Lower	Deutz
Thurston, 1884 ...	8·5 ×	14·0	160	...	...	$\frac{1}{2·66}$	0·33	0·17	0·52	0·155	0·155†	1·00	0·515	Lower	Crossley
Society of Arts Trials, 1888	9·5 ×	18·0	160	$PV^{1.38}$	$PV^{1.435}$	$\frac{1}{3·5}$	0·39	0·221	0·432	0·355	...	1·008	0·565	Lower	Crossley
	9·02 ×	14·0	200	$PV^{1.245}$	$PV^{1.35}$	$\frac{1}{3·2}$	0·37	0·211	0·352	0·398	0·039‡	1·00	0·575	Lower	Griffin (6-cycle)
Kennedy, 1888 ...	7·5 ×	15·0	210	...	$PV^{1.298}$	$\frac{1}{3}$	0.36	0·209	...	...	...	...	0·585	Lower	Beck (6-cycle)
Capper, 1892 ...	8·5 ×	18·0	160	$PV^{1.362}$	$PV^{1.374}$	$\frac{1}{3·4}$	0·39	0·228	0·389	0·405	...	1·022	0·58	Lower	Crossley
Robinson, 1898 ...	10·0 ×	18·0	170	...	...	$\frac{1}{5·17}$	0·48	0·287	0·33	0·383	...	1·00	0·60	Lower	National
Humphrey, 1900	26·0 × 2 cylinders A B	36·0	150 ...	... $PV^{1.321}$ $PV^{1.319}$	... $PV^{1.266}$ $PV^{1.204}$	$\frac{1}{5}$	0·47	0·278	0·242§	0·48	...	1·00	0·59	Higher	Crossley
Witz, 1900 ...	51·2 ×	55·13	95	...	...	...	0·55	0·28	0·52	0·20	...	1·00	0·51	Higher	Cockerill

* Radiation. † Conduction and radiation. ‡ Unaccounted for, including rejected in blank air charge.
§ In jacket water and exhaust valve.

modification of such details as admission valves, igniting devices, governing devices, and water and air-cooling devices. Starting-gear has also been carefully studied, and, both from the thermo-dynamic and the mechanical point of view, it may be safely said that these motors have attained a great measure of perfection. Secondly, parallel with the improvements relating to the motor itself, have proceeded those relating to means of generating the inflammable, gaseous, or vapour fuel intended to operate the motor. These improvements have related to the economical production of ordinary coal-gas, to the effective production of producer-gas from anthracite, bituminous non-caking coal, coke, and other solid fuels, to the treatment of heavy and light hydro-carbons and alcohol to produce an effective inflammable vapour, and to the purification and collection of blast-furnace gas, coke-oven gas, and natural gas.

With regard to mechanical improvements, he showed diagrams illustrating different typical engines now in use, classifying them into four well-marked divisions :—Those for town gas, for heavy oil, for light oil and alcohol, and those for producer and blast-furnace gas ; amongst the engines included in these diagrams were drawings of a 60-h.p. Mercedes and a 22-h.p. Daimler automobile engine, and also shown were standard gas-engines of from 60 to 600-h.p., and the Hornsby kerosene engine.

Commenting on these, he drew attention to the fact that an extreme diversity of construction is utilised in these engines. The very large gas engines have their pistons and exhaust valves water cooled. These large engines are still in a state of rapid flux as to cycle of operation and details used in carrying out the cycle. The stationary engines of moderate power may almost be considered to have reached a standard type, but it is a noticeable fact that the majority of those built in Britain employ tube ignition, and a hit-and-miss system of governing, whereas similar engines of Continental construction are usually fitted with electric ignition and throttle governors. The standard heavy oil engine of to-day may be considered to be of the Hornsley type, in which the fuel is injected into a hot chamber in such a way that very little mixing occurs during the suction stroke, that the air is forced into the combustion chamber, to mix with it, during the compression stroke, and that ignition is effected by the heat of the combustion chamber together with that due to compression. In connection with automobile engines, he mentioned the chief characteristics which are already well known to our readers, but pointed out that many different types are, however, now made, and he thought that it cannot yet be said that any fixity of type has as yet been attained ; he anticipated considerable variation in their construction within the next few years.

Speaking further with regard to mechanical details in general, he pointed out that lift-valves have entirely replaced the slide-valve, that the magneto appears to be destined to ultimately supplant all other forms of ignition, that modification of the hand-pump method is largely in use for starting the smaller stationary engines, and that compressed air is almost exclusively adopted for starting the larger ones. In all the very large engines multiplication of impulses is also very general.

Coming next to a consideration of the question of heat efficiency, he pointed out that it was in this direction that the physicist and the chemist can do most to assist the engineer, and he then proceeded to give a very lucid statement of the case with the assistance of the tables, which we reproduce, showing the extent to which improvement of efficiency has been made recently, and he indicated the directions in which further specific information is needed in order to render any very great additional progress possible.

Table I. gives heat-balance sheets from 1882 to 1900, and shows authoritative results obtained from different engines, from which it will be seen that there has been a steady increase of efficiency, a steady diminution in the amount of heat wasted into the water-jacket, but, on the other hand, a tendency for the amount of heat wasted in the exhaust to increase. As seen, the amount of heat converted into indicated work has risen from 16 per cent. of the total heat given to the engine up to 28 per cent. with recent engines, and higher efficiency than these are claimed, so that it may now be accepted that efficiencies of 30 per cent., and slightly over, have been actually reached. With regard to heat loss to the water-jacket, the percentage has improved from 51 and 52 per cent. in 1882 and 1884 to 24·2 per cent. in the large Crossley engine tested recently, and even in 1898 the test of the National engine showed the loss to be but 33 per cent. The heat lost in the exhaust has apparently risen from 31 per cent. to 40 per cent., and even to 48 per cent., the table proving the statement made concerning improved efficiency, diminished loss of heat to the water circulation, and increased rejection of heat in the exhaust gases made above.

To understand the reasons for this, he showed that it is necessary to consider briefly the thermo-dynamics of this subject so far as it is at present understood, in order to see whether further knowledge is required to enable the meaning of the relative losses and gains in these engines to be better appreciated. Although the general thermo-dynamics of the internal-combustion motor may be considered to be broadly understood, yet physical and chemical knowledge of the properties of air and other gases at high temperature is as yet insufficient to enable the physicist or engineer to formulate a quantitatively accurate standard engine of comparison ; that is, to formulate a conceivable engine in which all heat losses by conduction and radiation are suppressed, and where the efficiency is the full efficiency of the particular cycle under the assumed conditions, whether perfect or imperfect.

He considered that the present position of the theory of the internal combustion motor is in very much the same state as that of the steam engine was at the time of Watt, before any accurate determination had been made of the properties of steam. The lecturer did not hesitate to express the opinion that further improvement in the efficiency of internal combustion engines will be made, but he pointed out that with our present knowledge, it would be impossible to say that the next twenty years would carry this from the 30 per cent. of to-day, to say, a 60 per cent. efficiency. He thought that it was evident from examination of the change in efficiency which may be produced under certain conditions in an engine operated by pure air, that the efficiency of internal combustion engine can be increased to a very great extent. He then referred to the standard air engine first proposed by himself, in a paper read before the institute in 1882, in which it was recognised that a standard most nearly approximating to practical conditions of that day, would give constant efficiency for a given compression volume for all maximum temperatures above the temperature of compression. The lecturer, after stating that the standard engine of comparison, which would correspond most closely with to-day's practice, is an air-engine operated between a maximum and minimum volume as follows :—

adiabatic compression of air from maximum to minimum volume ; addition of heat at minimum volume, raising the temperature from the temperature of compression to the maximum temperature ; adiabatic expansion to maximum volume, and discharge of heat at maximum volume,

entered into the following consideration of this portion of his subject :—

Assuming constant specific heat of air throughout the temperature range, it can be shown that the efficiency is constant for all maximum temperatures ; that is, for all heat additions above the temperature of adiabatic compression. If γ for air be taken as 1·408, then

$$E = 1 - \left(\frac{1}{r}\right)^{0\cdot408}\text{ ; } E = \text{efficiency ; } \frac{1}{r} = \frac{\text{minimum volume.}}{\text{maximum volume.}}$$

Efficiencies calculated from this formula for various values of $\frac{1}{r}$ are shown in Table II. as follows :—

$\frac{1}{r}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{7}$	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{100}$
E	0·246	0·36	0·43	0·47	0·55	0·61	0·70	0·85

If, then, the compression space be diminished in our supposed engine, it is seen that the heat efficiency steadily increases from 0·246 at $\frac{1}{2}$ to 0·85 at $\frac{1}{100}$. No engines have been constructed with a compression space so small as one-hundredth of the total volume. Ordinary practice, however, now goes up to one-seventh, and even one-tenth is exceeded in one or two cases. Within practicable limits, then, if air had been the only working fluid, and its properties were as assumed, then efficiency could be improved within the range of one-half to one-seventh compression volume from 0·25 to 0·55. In the older engines, with considerable heat losses, the expansion curve followed $PV^{1\cdot4}$ very closely ; and accordingly these numbers could be considered as the standard efficiencies, and deduction only made for heat flow through the sides of the cylinder, tending to keep up the expansion line to the adiabatic. It is found, however, that with modern engines having minimum surface exposure and larger dimensions, the expansion curve falls more slowly than the apparent adiabatic. In an engine of usual design of large size the extreme appears to be $PV^{1\cdot2}$. Assuming air to be of constant specific heat, this can only mean that heat is being added during the whole expansion stroke to an extent sufficiently great, not only to make up for the loss through the sides of the cylinder, but to prevent the whole of the work being done at the expense of the initial energy of the working fluid ; that is, heat is added during the expansion stroke. In such a case heat is added to the working fluid, not only at minimum volume, but also during the whole expansion. In this case it will be found that the efficiency is not constant for all heat conditions above the temperature of compression ; and, as expansion $PV^{1\cdot2}$ may be taken as an extreme case, I have calculated various cases approximating to those met in practice.

(*To be continued.*)

POPULAR MOTOR CARS.*

By Mervyn O'Gorman.

PUBLIC favour has not yet been expressed with such spontaneous unanimity as to justify the title of my paper, but if a car is made sufficiently cheaply, and is designed so as to preclude it from becoming notorious, it is tacitly assumed to be popular *on one further condition*, rightly or wrongly, it must not be called a "freak." Ingenuity which may escape unpunished in a detail like a carburettor, or unseen in a lock nut, is unpardonable in the general design, and so we find a dummy bonnet containing a tool-box (or a suit of overalls), a tiller steering disguised with a hand-wheel, six-hole lubricators of which only two are operative, side chains without distance rods, back axles having one loose wheel but ornamented with an empty differential box, undished "artillery wheels" whose spokes can never be in compression or rims in tension, "balanced" brakes which are thrown out of action if the carriage-springs pass over a bump in the road, and latterly "automatic" carburettors which ensure a faulty mixture at all times. What matter the defects if fashion merely requires the vendor to embody in his story some of the mystic words:—"Mercedes bonnet," "wheel steering," "direct drive," "sliding gear," "3-speeds and reverse," "Cardan transmission," "artillery wheels," "long wheel base," &c., &c. together with such other catch words as have become fashionable in the catalogues if he is to sell a car at all. This is a regrettable state of things. (Fig. 1).

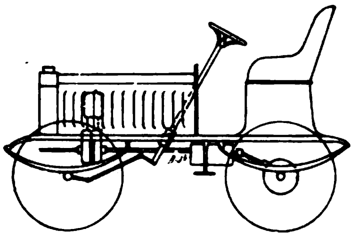

Fig. 1.

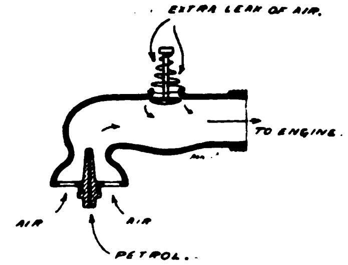

Fig. 2.

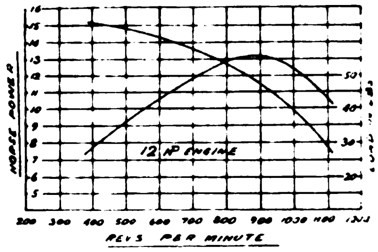

Fig. 3.

In the matter of shapes and words, fashion is the handmaiden of the advertiser. If we hear a property claimed with sufficient iteration, we presume it to be worth claiming, and a determined preference is thereupon evinced for features which on the great racers are doubtless a means to an end, but many of which must lose their merit in their adaptation to 5 or 10-h.p. cars.

It is like using Carlyle's diction without sharing his intellect and temper, or Meredith's style without his wit. Debateable matters on which the public has fixed views may be tabulated as follows:—

Engine.

I.	Multiple	*v.*	Single cylinders.
II.	Vertical	*v.*	Horizontal engines.
III.	Small enclosed	*v.*	Large fly-wheels.
IV.	Racing bonnets and cellular radiators	*v.*	Unobtrusive bonnets and gilled tubes.

Frame and Gear.

V.	Valves in pockets	*v.*	Valves in cylinder head.

Control.

VI.	Spray carburettor	*v.*	Surface wick and others.
VII.	Induction supply of gas	*v.*	Pressure supply.
VIII.	Side chains	*v.*	Direct drive, live axles (this fashion has lately received the order of right-about turn).
IX.	Four-speed sliding gear	*v.*	Two-speed of any other type.
X.	Governing by throttling the inlet	*v.*	Throttling exhaust hit and miss, altering mixture, &c.
XI.	Long wheel base	*v.*	Springs properly damped.
XII.	Heavy	*v.*	Light cars (here the turn is coming).

Body.

XIII.	Ornate Carosserie	*v.*	Simple and smooth bodies.
XIV.	Wheel steering	*v.*	Tiller steering.
XV.	Racing results	*v.*	Reliability Trial results.

In comparing these competitors for public favour, it may be useful to premise

I. That the following remarks are entirely restricted to popular as distinct from high-powered cars.

II. That they do not indicate a preference for any existing manufacture, but are the results of experiments on an experimental car built from stem to stern in a private laboratory.

And III., that it is useful to consider particularly the less fashionable alternatives, because the others do not lack supporters.

Engine.

Ask the ordinary man what he wants from his engine, and he will answer, if he is a wise ordinary man, "not to be bothered with it." But it will bother him :—

I. If it wastes the seating and luggage space of his car (*i.e.*, it should not occupy half the front of the frame).

II. If it does not give power and speed from the least amount of iron (*i.e.*, it should be a fairly high-speed engine).

III. If it fails to go a long way with the least amount of fuel (*i.e.*, it should have full compression at all speeds, and no valve pockets, &c., &c., so as to be efficient).

IV. If it is not simple to make and mend, cheap to buy, and if its troubles are not easily traced (*i.e.*, it should have a single cylinder only).

V. If it joggles and shakes him (*i.e.*, it should have a large flywheel, long connecting rods, and the carriage work be mounted on springs.

VI. If it requires much gear reduction, and refuses to travel slowly as well as fast, say from 2 to 20 miles an hour without gear change.

VII. If it does not start easily (which is a question of ignition, carburettor, and valves).

VIII. If it does not run silently (*i.e.*, it should have a perfect silencer at will, and normally use no gear reduction).

IX. If it upsets the car on turning corners (*i.e.*, its weight should be as low as in a horizontal engine).

X. If it fails to supply itself with lubricant, water, and fuel, and do its own repairs (*i.e.*, not want any, or a minimum).

XI. If it is not completely accessible for attention.

1. **Single Cylinder.**—A friend who owned a big car asked at the last Exhibition about getting a new one. He had but one stipulation, *it must have only one cylinder*. "If that cylinder doesn't start, I don't go out, and therefore I don't get caught; and if it misses fire on the road I know at once where to look for the trouble. It ought to be a good-sized cylinder, though," he added as an afterthought.

I found that he did not want a popular car, and I did not agree, but for the cheap car, when there is no question of starting on the spark, one cylinder wins the day the more easily that all appreciable engine vibration can be eliminated without perfect engine balance.

2. **Horizontal Cylinder.**—Having, as I would suggest, rightly preferred the cheapness and simplicity of one cylinder, a compromise must be made between the claims of the various engine positions to minimise the "bothers" of the ordinary man, and an investigation does not so markedly favour the vertical cylinder for popular cars as current usage would indicate. In some things the vertical engine cannot favourably compare to the horizontal—thus, in facilitating the use of long connecting rods, large flywheels, in securing a low centre of gravity, economy of seating space, and slow running (with a view to approaching the direct drive), which means efficiency.

Tabulating the opportunities of the horizontal position we find that:—

3. Flywheels

I. It allows more easily of large flywheels, thus obviating the intermittent effect of a single cylinder.

II. And, therefore, admits of slower running, thus economising on the weight of the gear the increased weight of flywheel.

III. It allows of diminishing the obliquity of the connecting-rod by using long rods and eccentric cranks.

IV. And this without raising the centre of gravity.

V. The horizontal position does not *per se* limit the engine speed.

VI. But facilitates the selection of any convenient place for the engine.

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* Paper read before the Society of Arts, April 20th.

VII. Incidentally it makes one more step towards a true, direct drive from an engine rotation in the same plane as the road wheels.

VIII. And allows of putting the water-jacket low enough to make a failure of the water-pump less important than if the cylinder were above the radiators.

IX. The horizontal engine may be stored almost entirely under the car frame, so as to give great latitude for variations of the carriage work.

4. Bonnets.

X. Without any waste of space by a prodigious bonnet.

XI. The horizontal position generally gives easier inspection of crank-pin bearings, and does not preclude perfect freedom of access to the valves and head (though the grave neglect of accessibility in the past is the chief cause of the disappearance of this type of engine).

I may say that I believe this disappearance to be temporary, and can quote the Wolseley, Siddeley, Duryea, Winton, Oldsmobile, Cadillac, James and Browne, Roots, Alldays, and others amongst the persevering minority.

5. **Valves in the Head.**—This title at once recalls a malady of the modern motor which is at the moment spreading a good deal. It is well recognised that the less the inside surface of the combustion space the less is the waste of heat, and in our motoring childhood, when we were free from fashion's fetters, we would have preferred the dome of minimum surface with the valves working in it. In our "De Dion days" one small pocket was added for convenience of inspection of both the valves, but now since then the excellent plan of opening the inlet by a cam has come into vogue, we have, without excuse, abandoned the thermal efficiency of the old design in favour of a purely ornamental symmetry. An engine, like a man, is no better for having a flat head and two thin flat pockets of small capacity and large inside surface, while the evil is aggravated by fitting each pocket with an uncooled inspection plate. Such a design precludes high compression and conduces to self-firing. The loss of heat may be surmised from the increased area of the combustion head exposed to explosion temperature indicated in the figure.

It is a pleasure to note that the engines designed by Mr. Craig, as well as the Duryea, the Clement Garrard bicycle engine, and a number of others, are rejecting this innovation.

6. **Automatic Spray Carburettor.** (Figs. 2 and 3).—It is with hesitation that I touch on any experiments on carburettors, because with marked regularity each week produces a new automatic carburettor. (Be it noted, however, that no seeker for truth and unpopularity has produced and sold a meter for measuring the degrees of "automaticity.") Pictures of carburettors mostly disclose a constricted air-passage, into which an ever-increasing jet of petrol is drawn in proportion to the increasing vacuum which results from the increasing rapidity of the stroke of suction as the engine goes faster.

Three evils result from this :—

1. That more petrol is wasted than need be (which does not much matter).

II. That a less total of mixture gets into the engine so that not only its output but also its compression and efficiency are diminished.

III. That what mixture does reach the engine is incorrect (and too rich, with a further resultant inefficiency and extra heating of the engine head).

Two or three cures present themselves :—

1. To make a leak into the partial vacuum by a valve : this is the automatic carburettor.

2. To blow more air in at the entrance.

3. To avoid having any constriction in the air-inlet and to supply at each stroke the quantity of petrol required either as a liquid, or a dust, or a vapour, or even up a wick.

Partly because the high price paid for certain cars, notably racers, warrants the expenditure of time and care in accurately adjusting the spring and movement of the "leak" valve, and partly because there is no means for the owners of cheaper cars knowing whether such adjustment has been made properly, the leak valve plan having well started will run its course. It is a delightfully ingenious and simple device which deserves success, and which I think the world owes to an Englishman—Mr. Pidgeon. Nevertheless, it has to be calibrated to work correctly, and in the absence of any instrument for so doing (other than taking at all speeds b.h.p. of the engine to which it is to be fitted), the appliances, as issued on cheap cars, are liable to be worse than useless.

Even when the right proportions have with care been got throughout the range of engine speeds from 200 to 2,000, I am not aware that any correction has been attempted for the great variation in density of both air and petrol with ordinary temperatures. Furthermore, any device that draws the petrol by suction out of its nook must be rigidly limited as to the weight of fuel taken in per stroke by the pressure of supply, which is atmospheric pressure. This limitation is unfavourable both in getting a maximum output from an engine of given size on the one hand, and to its fuel efficiency on the other.

Following out these views, a carburettor has been made for me on the other principle of blowing in the extra air to meet the extra demand. The first effects of this invention of the present system was to abandon one by one the float, the spray, the needle valve, and, of course, the automatic valve, so that in its present state it consists of a petrol tank with a pipe blowing air into it from the crank case through a wick.

(*To be continued.*)

THERE is no doubt that a large number of car owners would greatly appreciate the general adoption of a system similar to that introduced by the City and Suburban Electric Carriage Company, Limited, and the Electromobile Company, in regard to their electric vehicles, by which, for an inclusive charge per annum, automobiles might not only be garaged but thoroughly kept in order and always ready for the road. The campaign which has now been inaugurated by Messrs. W. Bath and Son, of Parkside Garage, Lorne Gardens, Regent's Park, N.W., will therefore probably prove widely attractive to car owners. Messrs. Bath and Son have opened a large garage both at the above address and at King's Lynn, and have arranged to keep owners' cars in order according to the size and power of the machines, at charges varying from 12 guineas per annum for the smallest, to 25 guineas for the larger and more powerful makes. Repair, in the sense in which Messrs. Bath and Son supply it for these inclusive charges, does not, of course, include the provision of spare parts, but apart from such repairs, and making good any damage by actual accident, they take all costs. It must be admitted that their charges are moderate, and it is satisfactory to learn that they are arranging with a number of garage proprietors and repairers throughout the country to act as their agents. Messrs. Bath do not at present state whether a contract with them will include the right to have a car kept in order at any of their agents, but it would certainly conduce to the general utility of the system if some such arrangement—say by the issue of what would be practically season tickets at perhaps some increase of price on the above figures, could be arranged for. In any case, the general adoption of a system such as Messrs. W. Bath and Son are displaying the enterprise to inaugurate cannot fail to have a very beneficial effect on the development of the industry, as there is no doubt that a large number of people would immediately become purchasers of cars if they were assured as to the maximum cost for upkeep and had the added inducement of being relieved of practically all bother and trouble.

MOTOR car drivers are not likely—after all—to be excluded from the main road from Spalding to Crowland after dark. As this runs along a bank it was considered that the driving of motors at night would be a highly dangerous proceeding, and it was proposed to prohibit motor traffic. With certain restrictions, however, as to lights—one being placed at each end of the road, and one in the middle, so that they shall illuminate the notice boards—and a speed limit of ten miles an hour, the Special Committee of the Holland County Council now recommend to the Local Government Board that the road in question shall be open to motorists as to other vehicles.

CLUB DOINGS.

WOLVERHAMPTON AUTOMOBILE CLUB.—The members' cars in Wrottesley Park, on Saturday, April 23rd.

Herefordshire Automobile Club.—This Club's hill climb is postponed from May 31st to May 10th.

Lincolnshire Automobile Club.—The members of the Lincolnshire Club held another very successful run—the second of the season—on Thursday, the 21st inst., when the George Hotel at Grantham was the meeting place. It proved a very popular tryst, too, for motorists were present from all parts of the county, some coming from as far as Gainsborough and Market Rasen. The array of cars which lined the yard of the picturesque hostelry proved an attraction to the townspeople, many of whom came to inspect the luxuriously appointed vehicles. One of the earliest arrivals was Mr. George Linnell and party from Market Deeping on an elegant 12-h.p. Wolseley, with canopy. The cars were inspected with much interest, and the way in which some of them were appointed made it apparent that the acme of road travelling had been reached. After an exchange of greetings and friendly intercourse, the party, which altogether numbered between 40 and 50, had a refreshing tea at the hotel. The return journey was commenced shortly after 5 o'clock, and by 6 most of the cars had left for their various destinations. The roads were pronounced to be in excellent condition, and the outing was immensely enjoyed.

The following is a list of the various cars which took part in the run and those who accompanied them:—Mr. H. T. Pilley (Boston), with Mr. C. Holland, Mr. Tebbutt, and Mr. Kitwood, on an 8-h.p. Peugeot; Mr. G. Linnell (Market Deeping), with Mrs. Linnell, Miss Linnell, Mrs. Matear and children, on a 12-h.p. Wolseley; Mr. Ben Smith (Horbling), on a 12-h.p. Richardson; Mr. G. Garnett (Gainsborough), with Mrs. Garnett, Miss Garnett, and Mr. Marsden, on an 8-h.p. M.M.C.; Mr. F. Richardson (Sibsey), with Dr. Miller and Mr. A. H. Holland, on a 10-h.p. Wolseley; Mr. and Mrs. A. A. Padley (Market Rasen), on a 6-h.p. De Dion; Dr. and Mrs. de Beauvais (Ancaster), on a 7½-h.p. Daimler; Capt. and Mrs. Lyall (Grantham), on a 7-h.p. Panhard; Mr. and Mrs. W. B. Jevons (Market Rasen), on a 9-h.p. De Dion; Dr. and Mrs. Sharpe and family (Brant Broughton), on a 12-h.p. Richardson; Dr. Gilpin (Bourne), with Mrs. Gilpin, Miss Wherry and Miss A. Wherry, on an 8-h.p. Peugeot; Mr. Cyril Nelson (Lincoln), with the Rev. Wardle Hall, on a 4½-h.p. De Dion; Mr. C. J. E. Parker (Grantham), with Mrs. Parker, and Mr. W. P. Dempsey, on a 10-h.p. Panhard; Mr. H. D. Tryon (Stamford), with Mr. F. D. Tryon, and Mr. W. T. Johnson, on a 10-h.p. Pick; Mr. R. M. Wright and Col. Harding (Lincoln), on a 12-h.p. Darracq; Mr. G. Wilkinson (Lincoln), on a 3½-h.p. Ariel cycle; Dr. Benson (Market Deeping), on a 3½-h.p. Royal George cycle; and Dr. Stanton (Market Deeping), on a 1½-h.p. Royal George cycle.

Nottinghamshire Automobile Club.—On account of so many members of this Club having intimated their intention of being present at the Gordon-Bennett Eliminating Trials in the Isle of Man, the Committee have decided to alter the date of their next hill climb from the 14th to May 28th.

West Surrey Automobile Club.—Last week the Annual Meeting of this club was held at the Lion Hotel, Guildford, Col. Howard Fairtlough presiding. Amongst members present were:—Messrs. E. Baring-Gould, F. Baring-Gould, Buttemer (hon. secretary), Crothers (hon. treasurer), Wilson Noble, Pullman, &c. The following members were elected to the committee for the ensuing year:—Col. Fairtlough, Messrs. W. G. Crothers, Wilson Noble, J. F. Ponsford, E. E. Pullman, A. C. Tessier, and R. W. Buttemer. It was announced that during the summer a hill climbing competition, in addition to several meets, would be held.

The club have been in communication with the Guildford local authorities with the object of inducing them to make a trial of Westrumite for dust laying purposes on a mile of the road between Guildford and Godalming, the club to assist in bearing the expenses of laying this down, and in all probability the suggestion will be carried out by the Guildford authorities.

Several new members were elected to the club, including Mr. E. Williams (Rydes Hill), Col. C. Treadcroft (Box Grove), Col. Rawstorne (Shalford), Mr. F. Houghton, and Mr. G. Sichel (Guildford).

The first run of the season took place on the 23rd, when members were hospitably entertained to tea by Mr. and Mrs. J. H. Knight at their residence at Farnham. Some eight cars, besides several belonging to visitors, took part, and the proceedings concluded by an interesting exhibition of the first petrol car made in the country, constructed by Mr. Knight in 1895, which ran merrily about the grounds during the afternoon.

Wolverhampton Automobile Club.—A delightful run was participated in last Saturday by about seventy members of this club and their friends, when Newport, Salop, was visited. Instead of meeting at the club headquarters, the members drove to Wrottesley Park, where they formed an imposing line when drawn up in "photographic array." About 28 cars took part in the run, these including the following: Mr. Trevor F. Young, 18-h.p. Star; Mr. F. C. Bishop, 7-h.p. Star; Mr. T. T. Mills, 8-h.p. Sunbeam; Mr. F. Platt, 6-h.p. De Dion; Miss Smith (Oaken), 12-h.p. Sunbeam; Mr. S. R. Rhodes, 16-h.p. Ariel; Mr. George Evans, 10-h.p. Wolseley; Mr. William Evans, 20-h.p. M.M.C.; Mr. Scott, 7-h.p. Panhard; Mr. Rochelle, Gladiator; Mr. F. Jenks, 8-h.p. De Dion; Mr. Arnold Mills, 7½-h.p. Wolseley; Mr. J. W. E. Stirk, 12-h.p. Sunbeam; Mr. W. G. Owen, 10-h.p. Wolseley; Mr. W. H. Evans, 10-h.p. Wolseley; Mr. Herbert, 5-h.p. Humbrette; Mr. J. O. Evans, 10-h.p. Wolseley; Mr. A. E. Price, 6½-h.p. De Dion; Mr. J. Barnett, 24-h.p. Wolseley; Mr. B. Payne, 4½-h.p. De Dion; Mr. Edward Lisle, 12-h.p. Star; Mr. Percy Bayliss, 7-h.p. Panhard; Mr. E. Bayliss, 8-h.p. Wolseley: Mr. Edward Lisle, jun., 7-h.p. Star; Mr. Lewis, 8-h.p. De Dion; Mr. T. Cureton, 12-h.p. Sunbeam; Mr. Lewis Connolly, 4½-h.p. De Dion; Capt. W. H. Haden (Sedgley), 7-h.p. Star.

The road taken was through very beautiful scenery, part of the run bringing back reminiscences of Charles Dickens' "Old Curiosity Shop." The magnificent roads under the control of the Staffordshire and the Shropshire County Councils were, in striking contrast, example for certain other counties to emulate. The headquarters for the day were at the Royal Victoria Hotel. After a look round the very interesting city the cars were turned homewards, Wolverhampton being again reached by lighting-up time.

The club within the next few weeks will be removing to its new headquarters in the Royal London Building in Lichfield Street.

The Scottish Automobile Club.—The opening meet of the season of this club took place on Saturday last, Callander being the point on which the cars converged. Both sections of the club were represented, and there was consequently a large turn-out. Friday had been very wet, and the roads wers expected to be heavy, but they turned out to be surprisingly good, and the day being fine a very pleasant outing was enjoyed. The cars numbered over fifty, and the number of members and friends present at the lunch in the Dreadnought was over two hundred. A very fine variety of cars found their way to the hotel, over twenty different makes being represented, including the Darracq, Wolseley, Daimler, Albion, De Dietrich, Panhard, Napier, Arrol-Johnston, Argyll, Humber, Progress, Clement, Benz, Mors, Peugeot, De Dion, Renfrew, St. Vincent, Beaufort, and Victrix.

Motor Volunteer Corps.—Mr. Malcolm J. Macgregor has been enrolled as a member of the corps.

The under-named were engaged under the General Officer Commanding the Western District on a staff ride in the neighbourhood of Bournemouth from the 20th to the 22nd April:—Lieut. the Hon. A. V. Verney-Cave; Members Lindsay Bury and F. J. Frost.

Mr. G. S. Watson drove the Director of Military Training, General Sir F. W. Stopford, K.C.M.G., on a tour in the vicinity of Clacton-on-Sea on the 22nd instant.

Mr. E. H. Clift was engaged under Major-General L. J. Oliphant, commanding the Home District, on a tour of inspection in London on April 22nd.

Mr. E. E. Bentall attended a staff ride under the General Officer Commanding the Eastern District on the 22nd instant.

Photo by C. G. Hodgkinson.

LINCOLNSHIRE AUTOMOBILE CLUB.—The Meet at Grantham, the cars seen in our photograph are those of well known Lincolnshire medical practitioners, who use the motor car for professional purposes. They are, reading from left to right, Dr. De Beauvais (Ancaster); Dr. Sharp (Brant Broughton); and Dr. Gilpin (Bourne).

DURING the present visit of the King and Queen to Ireland several journeys will be made by motor car, and the members of the Motor Volunteer Corps, who are residents in Ireland, have been assigned the important and honourable duty of acting as a guard of honour and escort to their Majesties, and of conveying their staff.

MR. HENRY NORMAN, M.P., who is a member of both the Executive and the Public Policy Committees of the A.C.G.B.I., and who was received recently in private audience by the Czar at the Winter Palace, St. Petersburg, was on Monday morning also received by H.M. the King at Buckingham Palace, prior to his departure for Ireland.

ONE cannot avoid feeling a certain amount of sympathy with Earl Russell on being fined £5 and £1 costs at Winchester for driving, as was alleged, to the danger of the public. It was at Winchester that Earl Russell distinguished himself as a lawyer by pleading his own case for damages against the War Office for injury sustained from one of their lurries, and on that occasion he was complimented on his conduct of the case by the Judge, as we chronicled some time ago. In the present instance he was also complimented by the magistrates, but they fined him the sum mentioned above all the same. Probably Earl Russell is of opinion that a sincerer compliment to his powers of persuasion would have been to dismiss the case.

IN the report of the Crystal Palace Company, just issued, the figures officially given of the number of visitors attending the Society of Motor Manufacturers and Traders' Exhibition, which took place in February last, is 165,000, this being about 45,000 in excess of the previous year. The directors also announce their intention, in view of the National Cycle Show having been discontinued, to organise an annual cycle show upon the same scale to take its place.

WHAT a change has come o'er the scene of late years, from the time when automobilists were treated with but scant courtesy in many parts of the country by hotel proprietors. Now in nearly every direction the order of things is reversed, and special inducements are held forth to attract the once much-abused motorist. One of the earliest to recognise the importance of the movement was Mr. Clevely, the proprietor of the Abbey Hotel, Kenilworth, and a visit to his house makes up for many unpleasant experiences which have even now to be gone through in other neighbourhoods. For the coming season Mr. Clevely has further extended his arrangements for accommodating automobilists. He has just completed a large new brick-lined inspection pit, has erected a drying room for clothes, &c., with lockers, and a small room where minor repairs can be effected, whilst besides petrol and lubricants he is endeavouring to keep up a stock of small accessories, which are so frequently run short of in travelling round the country.

THE LADIES' AUTOMOBILE CLUB NEW PREMISES.—The "Silence" Room.

The Tisbury Turmoil.

THE district council of Tisbury and its local magnates, including justices of the peace, and others, seem determined to go down to posterity with the inhabitants of Little Pedley in the Pound, Gotham, and other places known to story, as an example of how local affairs may be conducted—so as to amuse mankind. We chronicled at the time how the council had proposed to ask for the prohibition of motor traffic on certain roads, on the ground that they were too narrow; how subsequently a local automobilist requisitioned two justices of the peace to issue an order under the Highways Act of 1835, to the district council, to have the narrow roads widened to 30 feet. The district council appealed to Quarter Sessions, by which tribunal the magistrates' order was quashed, on the ground that the justices had viewed the roads consecutively and not together—which may or may not be good in law. But the funny part of the whole business follows. To widen one of the roads included in the justices' order involved cutting a slice off property owned by one of the justices themselves, so the council while the appeal was pending, not actuated, of course, by any feelings of revenge, but only desiring to do as they were told, widened the road and incorporated the slice of the progressive magistrate's property with the high road. Now, however, their own appeal has upset the magistrates' decision. The council would consequently appear to be in a dilemma. The judgment of the Quarter Sessions was good or bad. If it was right the council have illegally seized upon the magistrate's land; if it was wrong they must go on widening the other roads according to the original magistrates' order. In either case they are in something of a quandary. Let us hope that the muddle will prove a warning to other local bodies not to attempt prohibiting motor car traffic on local roads, on the ground that they are too narrow to accommodate it.

WE mentioned briefly in our last issue the fact that Messrs. Tilling, the London omnibus proprietors, were experimenting with their first motor omnibus. At the meeting held last week the chairman, Mr. R. S. Tilling, made the gratifying announcement that the directors thought they had found a vehicle which would answer their purpose, and that they had set aside a substantial sum for experimenting in this direction. The fact that Messrs. Tilling started originally with one omnibus only, and that they have now attained the very important position in the Metropolis which they hold, should be a guarantee that the motor omnibus in their hands will receive a fair chance of demonstrating its commercial capabilities. The shareholders appear to be in accord with the policy so foreshadowed, one shareholder in expressing his opinion upon the motor omnibus declaring that it would be more popular than "that modern car of Juggernaut, the new motor tram."

A CORRESPONDENT writes us an interesting account of a lengthy tour successfully carried out on one of the standard little Oldsmobiles which he had acquired from Messrs. Jarrott and Letts. In all he succeeded in covering 230 miles in 12 hours, and this without the storage capacity of the car for petrol or water being in any way increased. Our correspondent commenced his run at Llandudno and took the ordinary road past Conway, Llanrwst, and Llangollen, from which he ran on through Shrewsbury, Wolverhampton, Birmingham, and Coventry to London. He was twice a little embarrassed for a supply of petrol, which caused short stoppages, but the steady running and reliability of the little vehicle were most effectively demonstrated by the fact that the 230 miles from Llandudno to London were covered in 12 hrs. from the start, or in 10 hrs. 53 mins. actual running time (21 miles an hour).

THE LADIES' AUTOMOBILE CLUB NEW PREMISES.—A Corner in the Drawing Room.

Both His Majesty the King and H.R.H. the Prince of Wales have decided to have Collier tyres fitted to their new Daimler cars.

The entries for the May Day Automobile Parade for heavy vehicles amount to about 80 entries, which, before the final hour, will no doubt be considerably increased.

Sir Samuel Edward Scott, Bart., M.P., is amongst those who have just taken delivery of a 22–26-h.p. Coventry-built Daimler carriage.

On the Thames arrangements are in progress for holding a motor boat race from Kew Bridge to Erith, a distance of about 25 miles, to take place about the middle of next month. Although the Thames Conservancy regulations do not lend themselves to this class of sport, at the same time, under properly controlled conditions, no doubt a good race may very possibly be held.

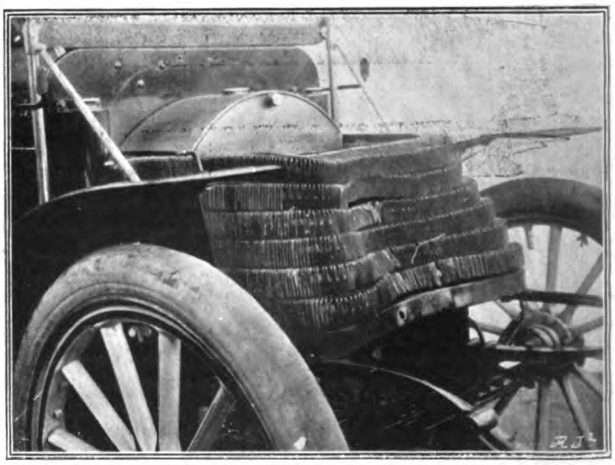
The extending employment of Westrumite, to which we refer editorially elsewhere, has attracted the attention of the Urban District Council of East Grinstead, and under the auspices of the surveyor to that body a portion of the London Road as it leaves East Grinstead is to be treated with the new preparation. As the traffic on this road is considerable, and it is usually very dusty in the summer months, the experiment ought to prove of value in demonstrating the reliability of Westrumite in hot weather.

We learn from Messrs. Merryweather and Co. that the chemical fire engines which they are introducing in this country, and which we have described on several occasions in our columns, are very effective in extinguishing burning petrol. As our readers will remember, the chemical fire engine ejects a solution of carbonate of soda, which is being acted upon by sulphuric acid, and is consequently disengaging large quantities of carbonic acid, the gas thus disengaged being much more effective in extinguishing flame than mere water can ever be.

Major Baden Powell, who is widely famous in connection with his experiments with kites, and who, like Mr. Cody, has been successful in rising to high altitudes in the air by their assistance, has been bringing out what might be roughly described as an aeroplane boat. Everyone knows how a boat running down a water chute takes a high leap in the air after meeting the water. Major Baden Powell's invention consists in employing in a similar way a light boat provided with aeroplanes outstretched like the wings of a bird. The boat is 18 feet long and only weighs 50 lbs. It is started at the top of a chute like an ordinary water chute boat, but instead of making a short jump in the air after striking the water, at the bottom, the aeroplanes enable it to make a considerable prolonged flight, much after the manner of a flying fish, which, of course, does not really fly, but only glides like Messrs. Archdeacon and Voissin's machine. A special chute is to be put up for this boat at the Crystal Palace, and there is no doubt that it will form a considerable attraction. It may seem at first sight that the invention has little scientific value, but everything which tends to increase the knowledge mankind possesses of the action of aeroplanes cannot help to be of use in bringing nearer the ultimate solution of the problem of flight.

A practical demonstration will be given, on May 5th, at the premises of the Cadogan Garage Company, in Chelsea, with the special non-explosive vessels for inflamable liquids — such as petrol— for which this Company have the agency in this country. Similar tests, showing the absolute safety of these vessels, have already been made before representatives of various foreign Governments, and we learn that the tests are again to be carried out on an extensive scale. The Company intimate that they will be pleased to invite the attendance of all those who are interested.

A good many people who are intending ultimately to take up motoring have, we believe, got some sort of idea that motor cars will, in the near future, be considerably reduced in price. We doubt whether this is at all likely to be the case with the better known makes. The De Dion Company, for instance, inform us that their margin of profit at present is very small, and that such as it is, it is only obtainable owing to the fact that all their parts are turned out in large quantities and carefully standardised, as will be understood from the fact that during the past year they have sold some 1,400 cars of the 6-h.p. type. Intending purchasers, therefore, need not in the case of vehicles of this class look forward to any serious reduction of price in the near future.



The accompanying illustration bears striking testimony to the quality of the materials and workmanship used on the Wolseley Cars, and also to the advantages which are obtained by the type of radiator that is one of the distinctive features of the Company's vehicles. The photo shows the front portion of a 10-h.p. car, which when travelling at a good speed, suddenly came on a slippery stretch of wet cobbles, that caused a bad skid to occur. The accident occurred at a sharp bend, and there was insufficient room to straighten the car without risk of running along the pavement. It charged the angle of a wall where there was a passage one side and a doorway the other, and a block of masonry fell from the top of the wall on to the radiator. The force of the blow can well be imagined from the appearance of the frame, which was forced inwards about five inches by the collision. The steering pillar was also bent, and the head lamp crumpled up. This however was the extent of the damage done, and, with the assistance of a local blacksmith, who straightened the steering pillar, the car was able to proceed on its way, travelling a considerable distance, both during the following day, and afterwards to the makers' works at Birmingham. Apparently the damage done to the radiator did not cause it to leak, though even if it had, the stepped system adopted in the construction would have rendered repair easy and inexpensive. Both the owner and the makers are to be congratulated—considering the seriousness of the mishap.

Deaf people are usually rather courageous than otherwise, but we think the palm must be given to a deaf cyclist whose experiences have been recently made public. Owing to the fact that he cannot hear he has had several serious accidents. Once he and his machine became intimately mixed with a heavy van. On another occasion a van ran into him from behind, the result of which was a week in hospital; while on a third occasion a similar mishap resulted in a broken collar-bone, a dislocated shoulder and knee-cap, and a fracture in three places of his under jaw and of his skull necessitating trepanning. Notwithstanding these adventures the cyclist declares that his nerves are unaffected and that he is still as devoted to his favourite pursuit as ever. The general aspects of the deaf cyclist as a social institution, however, demand some consideration. Once upon a time the bicycle was the fastest thing on the road, and the cyclist, even if deaf, was consequently in but little danger. But the whirligig of time has brought its revenges, and now a really deaf cyclist may become a danger not only to himself but to other people. People who do not know he is deaf will naturally expect him to get out of the way when they give sufficiently audible notice of their approach. The failure of the deaf cyclist to respond to these signals may but too often result in disaster. The courageous gentleman (to whom we have referred above) proposes that deaf cyclists should carry red danger-plates at the rear of themselves or their machines. Anyone then overtaking a cyclist thus embellished will know it is no use to ply his hooter, and must patiently wait until accident or caprice induces the rider to leave sufficient room for the passage of his car. To make this device the more effective we venture to suggest that the red rear danger-plate should be suitably illuminated at night.

Steady progress is being made in the Federation of Automobile Clubs in France, already 22 out of about 30 of the clubs having formally notified their adherence to the Association. Prince P. d'Arenberg has been appointed president and MM. Hector Franchomme and Perigot vice-presidents.

A few small, though important, improvements are found in the last consignment of Cadillac cars that have been received by the Anglo-American Motor Car Company from the States, and these tend to still further enhance the value of these useful, durable, and capable little vehicles. The switch by which either of the ignition batteries, or both of them, can be brought into use is now mounted upon the rod by which the oil feed from the large lubricator to the cylinder is turned on, so that it is now impossible for the driver to start the engine and to forget the oil feed. Other improvements relating to the lubrication are that the grease cup feeding the eccentric that operates the inlet-valve is now mounted near the rear end of the eccentric rod, and is therefore much more ready of access, and that oil-ways are cut through the cylinder wall and across the piston rings in such a way that the splash in the crank-chamber continues to lubricate the entire piston; small grooves are turned in the piston between each of the rings, and each piston ring has a shallow groove cut across its face so that the circular grooves are connected together by them. The grooves in each alternate ring are, of course, on opposite sides of the piston. An alteration, too, has been made in the connecting-rod, the cap of the big end bearing being now hinged on the under side, so that there is only one nut required for fixing it. Perhaps the most important feature of the cars now being sold, however—and we understand that the demand for them is still on the increase—is that extra heavy and large Dunlop tyres are now being fitted to them all, without extra charge.

Automobilists who have secured Oldsmobile runabouts have soon found that they are fully worthy of a more luxurious and comfortable body than the regular standard body which is usually fitted on the cheapest form of this popular car. In our photograph we show Mrs. F. J. Thomas in one of these cars fitted with a "model de luxe" body, which has recently been made a feature by Charles Jarrott and Letts, Limited, as suitable to British motorists. Amongst others who have shown their appreciation of this type of carriage work are Sir Charles Hamilton, Dr. Harold Haigh, Major Rogers, Capt. Kerr Smiley, and Mr. C. W. Biggs.

There is every probability that the French automobile industry will be well represented at the Cape Town Exhibition at the end of this year. At any rate, the Marquis De Dion, the President of the Chambre Syndicale de l'Automobile has addressed a circular letter to his colleagues giving particulars of the Exhibition, the amount of space available for French exhibitors, the probable cost of consignment, and other matters. It is to be hoped that English manufacturers will make a strenuous effort to secure the greater part of the Cape market for themselves. They will certainly find it advantageous in designing vehicles for exhibition there to bear in mind the general principles which we have pointed out should govern the design of Colonial cars.

Over thirty entries have already been received by the A.C. of Belgium for the Circuit des Ardennes.

The Hon. Charles Weld-Forester has recently secured a 15-h.p. British-built Duryea tonneau car of the latest side entrance model.

The dates definitely fixed for the Spa Automobile Week are from July 26th to August 1. The events will include the Spa-Malchamps Hill Climb, a 100 kiloms. trial for tourist motor bicycles, and a 120 kiloms. run for cars, etc.

The nominations to the Special Commission appointed in Paris for inquiring into the possibility of creating a special tariff for public service automobiles have now been made, Mons. Autrand, General Secretary of the Prefecture of the Seine, being nominated President. Mons. Bixio, representing the Paris Cie Generale des Voitures, and M. Max Richard, representing the Chambre Syndicale de l'Automobile, have been appointed members of the Commission.

On the 13th inst. a large portion of the Cadillac Automobile Company's premises in Detroit were burnt down, the assembling shops being entirely gutted, entailing a loss of about £40,000. Fortunately the warehouse and machine room remain intact, about 500 completed vehicles and 2,000 engines being stored in the former. Almost before the flames were extinguished arrangements for avoiding delay as far as possible were already being made by the Company's officials, and it is hoped that within 30 days from the date of the fire all shipments will be resumed as if nothing unusual had happened.

The Touring Club Italiano have sent us their very admirable map of the Swiss-Italian frontier, which is singularly clear and lucid, and drawn on an excellent scale. The map is accompanied by a scheme which the Touring Club has drawn up for re-modelling the main features of the Italian hotels, and bringing them into line with one another, both as regards general accommodation and their scale of charges. Should the Touring Club be successful in effecting the general adoption of these requirements, it would certainly greatly conduce to the pleasure of touring in Italy, whether by cycle or automobile.

Some instructive tests of the efficiency of motor cyclists in carrying despatches under conditions similar to those prevailing in actual warfare have been organised and carried out by the Austrian A.C. in conjunction with the Austrian War Office. The motor cyclists were confined to the side roads running parallel with the main thoroughfares, as it was assumed that these would, in time of warfare, be blocked by troops and transport. If the motor cycles happened to break down, the "post" was only to be allowed to proceed by means of ordinary bicycles or horse-drawn vehicles, the assumption being that during actual hostilities automobile transport would not be available. A circle was marked out, starting from Vienna, running through Kaumber, Hadersdorf, Laa an der Thaya, and so returning back to Vienna. Two "posts" were started, one consisting of a single motor bicycle, and the other of a similar machine, supported by an auxiliary. Relays of different riders carried the two "posts," and the times were respectively 8 hrs. 29 mins. and 9 hrs. 33 mins.

The inhabitants of Western Australia appear to be taking kindly to the introduction of motor 'buses, and the machines which have already been at work out there have evidently been appreciated. Quite recently the Stirling Motor Construction Company, of Edinburgh, have shipped several of their double-decked 'buses to Freemantle, where, during the last nine months, two of their single-deck vehicles have been in use. The new vehicles, which have been specially designed for use in Perth, W.A., provide accommodation for 30 passengers,—14 inside and 16 outside. Special attention has been given to reducing the weight and length of these 'buses. They weigh about 2 tons 15 cwt., and thus the maintenance of the solid rubber tyres is not likely to be very excessive. The over-all length is 16 ft. 9 in., so that they are not unwieldy even in dense traffic, and the extreme width is 7 ft. The length is reduced to that which we have mentioned by the system adopted by the makers of fixing the engine beneath the driver's feet. A 24-h.p. engine is employed, and the change-speed-gear gives normal speeds of 4, 8, and 12 miles per hour respectively. Two systems of ignition—high-tension from accumulators, and low-tension from magneto—are fitted to the engine, and a natural water-circulation is employed.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Hugh Cooper and Co. (Limited), 78, King Street, Manchester.—Capital, £3,000 in £1 shares. Object, to carry on the business of manufacturers of and dealers in cycles, motor cars, carriages, &c.

Motor Improvements Company (Limited), 1, St. Mary Axe, E.C.—Capital, £5,000 in £10 shares. Object, to manufacture and deal in motors, motor cars, &c.

New Century Lock and Engineering Company (Limited), 235, High Holborn, W.C.—Capital, £500 in £1 shares (400 preference). Object, to acquire the business now carried on at St. George's Works, George Street, Eden Grove, Holloway, at 235, High Holborn, W.C., and elsewhere, and to carry on the business of electrical, mechanical, and automobile engineers, &c.

Reliance Cycle and Engineering Company (Limited), Howell Croft Works, Bolton.—Capital, £1,000 in £1 shares. Object, to manufacture and deal in cycles, motor cars, &c.

Universal Automobiles (Limited), 45, Esmond Road, Kilburn.—Capital, 1,000 in £1 shares.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published May 5th, 1904.

8,004. T. W. S. Hutchins and W. Adams. Friction clutches.
8,410. S. G. Board. Tyres.
8,842. L. G. Merkt. Mixing valves.
12,639. T. H. E. and L. Gardner. Ignition apparatus.
12,800A. J. D. Roots. Motor road vehicles.
13,894. A. M. Pinnell. Brake for motor cycles.
15,859. Maison Zurcher Luthi and Company. Valves.
16,192. W. J. Lloyd and W. Priest. Frames of motor cycles.
20,165. Fried. Krupp Akt. Gesellschaft Grusonwerk. Friction clutches.
26,214. H. H. Hennegin. Fuel regulators and carburetting apparatus.
26,635. E. Stubbs. Variable speed gear for motor cycles.

Applied for in 1904.

Published April 7th, 1904.

659. A. V. Hickman. Anti-side-slipping device.
1,600. F. J. Holloway. Motor cycles.
3,424. — Collier and others. Fastening of elastic tyres to vehicle wheels.
3,462. — Vivinus. Friction clutch.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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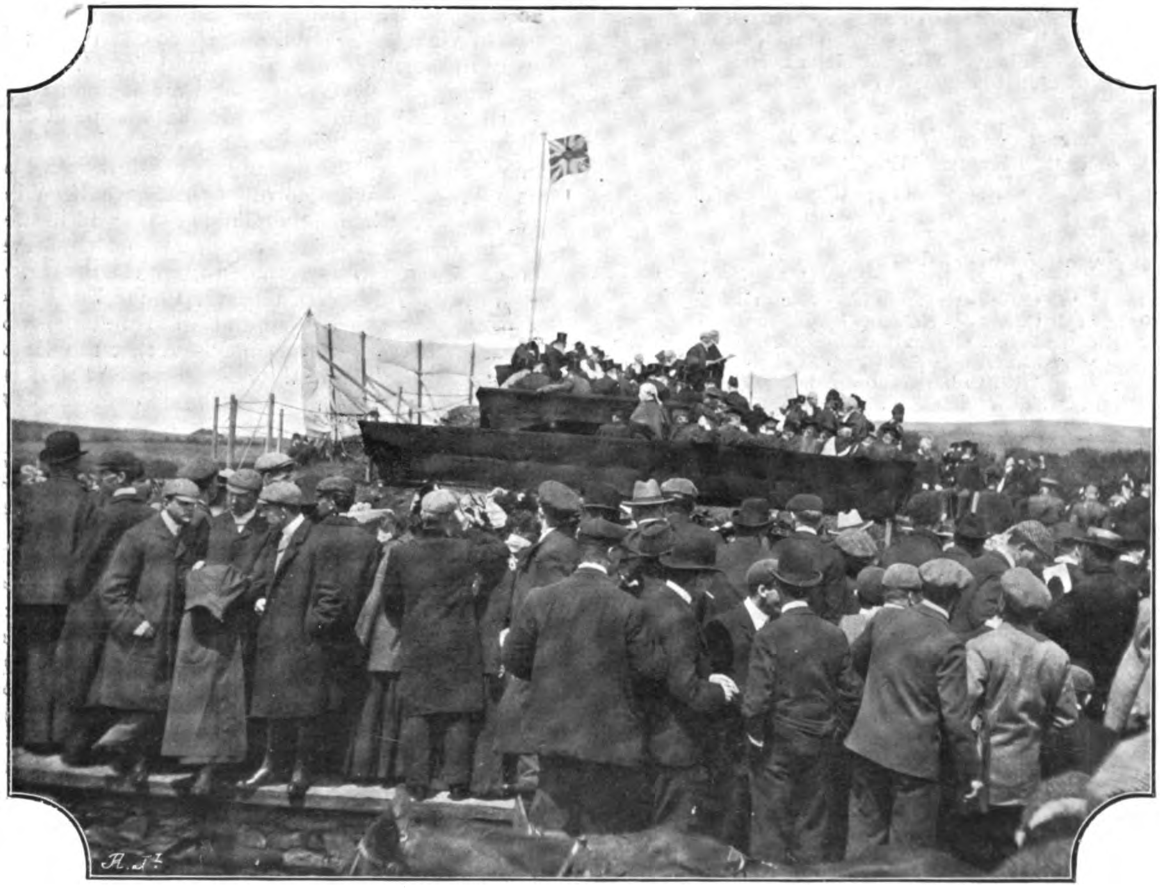

PROMULGATING THE LAW ON TYNWALD HILL IN THE ISLE OF MAN.

Every new law passed in the Isle of Man is invalid until formally promulgated from this famous Hill near St. Johns. It was the carrying out of this very quaint custom on Thursday last which formed the final ceremony in legalising the holding of the Gordon-Bennett British Eliminating Trials which commence next Tuesday.

THE AUTOMOTOR JOURNAL.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
May 7 ...	*Quarterly 100 miles Trial.
May 10 ...	British Gordon-Bennett Race Eliminating Trials.
May 11 ...	*Isle of Man Hill Climb.
May 12 ...	*Speed Races at Douglas.
May 14 ...	Auto Cycle Club Hill Climb.
May 19–20 ...	Glasgow-London Non-Stop Run.
May 28 ...	Auto Cycle Club Combined Run to Yarmouth.
May 28 ...	Nottinghamshire Club Hill Climb.
June 11 ...	Automobile Races, Ranelagh Club.
June 27–July 2	Motor Bicycle Endurance Trial.
July 30 ...	British International Cup for Motor Boats.
August ...	Reliability Trials for Motor Boats.
Sept.	*Reliability Trials.
1905.	
May 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
Apl. 30–May 12	Antwerp Salon.
May 8... ...	Exelberg Hill Climb (A.C. Austria).
May 16 ...	Carburettor Trials (A. C. de France).
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May	Guadarrama Hill Climb (A.C. Spain).
May 8–12 ...	A.C. Bordelais Automobile Week.
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12–15 ...	Tours Tourist Trial.
May 15 ...	Perigueux Hill Climb (A.C. Dordogne).
May 27 ...	Circuit National Belge.
May 23–31 ...	Aix-les-Bains Week.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 15–23 ...	Ostende Week.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 13-14 ...	Calais-Dover-Calais (motor boats).
Aug. 14–20 .	Paris–Deauville Motor Boat Race.
Aug. 15 ...	Calais-Boulogne-Calais (motor boats).
Aug. 21 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Obstacle Race in the Isle of Man.

EVERYONE will recollect Mark Twain's delightful account of the French duel in which he was prevailed upon to act as second, and in which the requirements, rules and regulations were so complicated, and rendered the employment of any dangerous weapon so difficult, that he finally proposed to decide the point of honour by a combat involving the use of "brickbats at half a mile." One is reminded of this classical occasion by the complicated system of rules that have been issued in regard to the Eliminating Trials to be held in the Isle of Man. Every inhabitant of that island (and everybody else as well) is to be excluded from the course, together with his ox and his ass and everything that is his, under a penalty of £20. We and most other people had accordingly come to the conclusion that the Eliminating Trials were to be a real test for racing, for, if not, why so carefully keep people off the course? But the *résumé* of the latest official draft of the rules, which we reproduce in another column, shows that the organisers have taken the most elaborate trouble to prevent the ceremony approaching a race in almost any single particular. There are a large number of controls, though that is not to be objected to, but the amusing feature is that in between the controls the cars are not allowed to proceed at racing pace, but only to exceed a certain minimum speed. Any competitor who goes faster will not, it is laid down, do himself any good, but if he takes longer, it is solemnly announced that "the fact will be noted." Then the arrangement in controls is worthy of remark. No one is to be allowed to derive any apparent advantage from arriving at a control in advance of the other competitors. He may come in first, but, if the marshals like, they may start him off last on the other side. The object of this regulation is not, on the face of it, apparent, though it should doubtless have the effect of making the drivers extremely polite, not to say subservient, to the marshals. Speeds, we are told, are to be taken at certain points between the controls, and only then will there be anything approaching real racing. But, as the maximum distance over which racing speed is to be recorded is only 2¼ miles, this is a very inadequate test for a race like the Gordon-Bennett. Altogether these portions of the rules strike one as bordering on the farcical. Ability to stop quickly, and, above all, the complete control of eye and nerve which is necessary for re-starting satisfactorily, are not at all likely to be the same in a competition in which no one is really racing, as they will be in the actual race, and the Eliminating Trials are a test of the competing drivers quite as much as of the competing cars. Perhaps, before the contest finally takes place, someone with a sense of humour will re-model or abolish the most eccentric of the provisions to which we refer.

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The World's Fair.

AFTER preparation, rarely, if ever, equalled and certainly never excelled in the case of any undertaking of the kind, the St. Louis Exhibition has at length opened its doors. It is a stupendous affair, and it is satisfactory to recall that the British Government is taking an official part on behalf of English exhibitors on a scale which our Government has never adopted before, £150,000 having been contributed by the English Exchequer, while the presidency of the British section has been accepted by H.R.H. the Prince of Wales. This official action has had the effect of encouraging a large number of British exhibitors to embrace the opportunity offered, and, that they have done so on a lavish scale, is illustrated by the fact (somewhat naively announced) that the catalogue of the British exhibits weights 4 lbs. avoirdupois, and the amount of space occupied by the British exhibitors 206,402 feet. Altogether, the cost of the great show is estimated at £10,000,000 and upwards, and as some 4,000 journalists attended the opening, an adequate account of the proceedings is likely to find its way into the general press. The time of the 4,000 journalists will probably be fully taken up if they attempt an adequate description of the exhibits, for there are no less than 250 acres of them, a very fair portion being occupied by self-propelled traffic, and a still larger and more impressive one by the allied and supporting engineering and metallurgical exhibits. The interest of our readers will be naturally concentrated on these and on the aeronautical exhibits and contests which have been arranged, the rules regulating which we have already fully and repeatedly given. The small motor cars that we illustrated and described many months ago, which will be available to take visitors round the grounds and from one department to another, will be a feature of the Exhibition.

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Another Unsavoury Police Incident.

MR. CHARLES JARROTT has been "Hooked," that is to say, he has fallen into a police trap on the Basingstoke Road, been summoned before the magistrates at Hook, and convicted. We are sorry, for he is one of the most careful drivers on the road, and one of the most considerate for the rights of other users. The case was of the typical kind, but includes a novel feature to which we will refer presently. It was typical because Mr. Jarrott was, as we have the very best reason to believe, driving at moderate speed. He was bringing Mrs. Jarrott back from Bournemouth, where she had been to recover from a recent illness, and was still only convalescent. Under such circumstances it was unlikely that he would have been venturing on high speed, far less the 32 miles an hour which the policemen, with perfect synchronisation of stop watches, declared, and as far as the magistrates were concerned, proved. The evidence was all one way. As neither Mr. Jarrott himself (whose time is, of course, too valuable) nor any witnesses on his behalf attended, the solicitor who represented him could do nothing more than criticise the evidence for the prosecution. Under such circumstances, a conviction was almost a foregone conclusion. After all, the magistrates had only one side of the question before them *on oath*, and of what is not on oath they cannot take legal cognisance. Motorists would do better under such circumstances, when they can neither attend themselves, bring witnesses, nor make a proper fight of the case, to write to the Bench, plead guilty, and agree to pay any fine that may be inflicted. Usually the fine is less, and they at any rate save the expenses of a solicitor. One should either not fight at all, or fight to a finish. There is, however, an unpleasant feature in connection with the present case. A friend of Mr. Jarrott's, who was aware of the trap, rode out a mile in advance of it and warned approaching motorists of its existence. We do not for a moment suggest that the motorists so warned were exceeding the legal limit or in any way driving to the public danger, but when there is a police trap, the police are invariably determined to obtain convictions, and unless any passing motorist crawls through the trap at a speed which would render the proceedings not merely unjustifiable but positively ludicrous, they will be charged, the police stop watches will indicate the precise speed per hour previously arranged on, and whether the victim is travelling upon a 40-h.p. Mercedes or a Benz model of ten years ago, the police will record the same speed against him. Even in the case of motorists proceeding at between two and five miles an hour, exasperated policemen have occasionally gone the length of issuing summonses. But in the case of this particular trap a new feature was introduced. The cyclist's warning having evidently proved effective, and the police observing that every motorist passed through the trap at an unprecedented crawl, one of the guardians of the law, it is alleged, disguised himself as an independent gentleman, mounted a cycle, and putting himself forward as a friend of motorists generally, informed those approaching that the trap was "off" and that they might drive as fast as they liked. This was a deliberate misrepresentation, not to apply a shorter and more accurate term. But motorists have become expert in recognising police officers under *any* disguise, *ex pede Herculem*—they can now recognise a policeman by his boots, so that the stratagem failed. But what a preposterous example this sort of thing is to those classes who are supposed both to stand in awe of the police and look up to them as models of proper behaviour. Hitherto the Hampshire police have been conspicuous for their moderation and reasonable treatment of motorists. This is one of the first attempts to introduce into that county the tactics which have so long made Surrey notorious and have exasperated its hotel proprietors and business people. We cannot congratulate the Hampshire police on the style of this attempt to compete with the tactics of the neighbouring county.

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The Commercial Aspect of the Alcohol Question.

THERE is a great deal in choosing the right instant in which to come before the public with a Paper on an important subject, and Mr. Thomas Tyrer, F.I.C., F.C.S., certainly has chosen the psychological moment for reading his exceedingly comprehensive and suggestive Paper, on the "Need of Duty-Free Spirit for Industrial Purposes," before the Society of Arts last week. The all-round interest in the application of alcohol to industrial purposes generally, and in particular as a source of power for the propulsion of motor cars, has gone on increasing week by week; ever since, in fact, the publication by us in February, 1902, of a translation of the first really important contribution to the subject by Herr Neuberg, accompanied by an article commenting thereon, followed not long afterwards by the French Circuit du Nord. Since then most of the Governments of Continental countries have instituted competitions, exhibitions, and other functions designed to promote the employment of alcohol for all the various purposes to which it is applicable, mainly with the intention of benefiting the agriculture of the particular countries they represent. At length the inhabitants of this country are waking up, somewhat late, no doubt, but still as usual in advance of the Government, and a serious movement is on foot for getting rid of some of the disabilities which stand in the way both of the extensive production of a commercial alcohol suited for motor car propulsion and the other purposes to which alcohol is applicable. Mr. Tyrer's valuable Paper, therefore, comes at the right moment, and the facts which it contains are nothing short of a revelation. His data and statistics fairly take away one's breath, for important as the future of alcohol is as a source of motive power, the production of power is only one of the almost innumerable purposes for which alcohol can be employed. For example, in conjunction with the incandescent gas mantle, it forms a magnificent illuminant, and one of the cheapest on the market. Alcohol lamps are now made on the Continent capable of giving as much as 1,000 candle power, while 250 candles is quite a common result to obtain, and the cost is moderate in the extreme. And not only is the light a cheap one, but it vitiates the atmosphere in which it is employed to a sensibly less degree than in the case of any other illuminant except incandescent electric light. As regards the applicability of alcohol as motive power, we do not need to recapitulate all that we have previously said on that point, or to again point out that when properly used it is capable of replacing petrol in every way, while giving more power for the same quantity of the substance used, and being at the prices now reigning on the Continent appreciably more economical. Coupled with Professor Redwood's prophecy of the probable impending shortage in petrol, the application of alcohol for power purposes becomes one of supreme importance.

But valuable and important as are the uses of alcohol, both for producing power and light, they are not the sole, or perhaps even the most important, purposes to which alcohol is applied. Alcohol may be satisfactorily used to produce light and to propel vehicles, but there are other agents which will do this. Alcohol, however, is absolutely essential in a large number of important industries. Principal amongst these, as everyone is aware, is the dye industry. But not everybody is aware of how enormously important to the dye industry it is. And Mr. Tyrer has done good service in obtaining, from various foreign manufacturers, lists of the principal dyes which *can not* be manufactured without its use. These are extremely extensive, and include such well known and universally-employed dyes as Congo orange, benzo-purpurine, malachite green, and many others. While for the preparation of a large number of medicines, and valuable chemicals, alcohol is absolutely indispensable, with the result that most of these medicines are now imported from abroad.

Mr. Tyrer had an enormous amount of ground to cover. His paper was so exhaustive, compiled with such evident care, and in consequence so accurate, that it will for some time to come be a regular text book on the subject.

There is little wonder that with the facts as enunciated by Mr. Tyrer there should be a powerful agitation in favour of reform, but it would seem apparently that the reform needed is not so much in the way of fresh legislation as in the methods of the executive. The existing laws empower the Inland Revenue authorities to authorise any person to receive alcohol for use in the art and manufacture in which they are engaged (and for no other purpose) without payment of duty. This, one would think, would be ample, and as at present administered under the more enlightened policy which has prevailed in recent years, it is sufficient to enable experimental laboratories to carry on research without the payment of the duty which they would at an earlier period have been compelled to pay. It would seem that it could be made quite adequate to cover the case of any manufacturer whatever, and it is mainly the nervousness of the Excise officials which has prevented this from being done—a point which was fully endorsed by Mr. Austen Chamberlain in the House of Commons on Tuesday last. They are, of course, as Mr. Tyrer observes, appointed to secure and protect the revenue. It is not their function or business to foster and promote industries, and so, perhaps, they have been unduly cautious. But still it is characteristic of our executive methods that where the law provides an opportunity for affording relief, so little use should be made of it. For fear a few bibulous gentlemen—knights of the order of the red nose—should attain a few quarts of "potential whisky" per annum without paying the duty on it, a Government department has practically killed the great dyeing industry which has, in consequence, transferred itself practically *in toto* to Germany and France; has so heavily handicapped the manufacture of a large number of drugs, medicines, and chemical products, that they are imported from abroad; and has rendered the development of a source of light and power, which could be produced in these islands, practically impossible. This is certainly very like the policy of killing the goose that laid the golden eggs. The revenue that would be sacrificed by a more indulgent administration of the law is a trifle compared with that which has been lost by this wholesale crippling of industry. And let us think for a moment what it would mean for the agricultural industry. The prime sources of alcohol are grain, beetroot, and potatoes. With the existing restrictions removed, and the extensive employment of alcohol for power and illuminating purposes, agriculture, drooping now in many parts of the country, could not fail to revive. No one who has seen the wealth of the beet-cultivating peasant proprietors of the north of Germany can doubt this for a moment, and for Ireland the possible increased demand for the potato might mean regeneration. It is an enormously important question, and it is to the very great credit of Mr. Tyrer that he brings its enormous importance into full relief. We trust that the Government will see its way to the appointment of the expert committee which has been proposed, and that the result will be at an early date to propound a satisfactory solution of the question.

GORDON-BENNETT CUP ELIMINATING TRIALS.

Photo by T. Keig.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—The Douglas Promenade, where the speed and acceleration tests are to take place on Thursday next.

THE official programme for these trials in the Isle of Man, held to select the three cars and drivers to represent the United Kingdom in the Gordon-Bennett race, is now issued. In this week's issue we publish a specially prepared map showing the course and all the points of interest in connection with the events, giving in detail the various controls, the mileage of the course, indicating where the speed tests will take place during

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Some early arrivals in the Isle of Man. Mr. S. F. Edge and his "constant" and Mr. Stocks in their touring cars just after landing at Douglas. Mr. Edge has since driven over the entire course, and he telegraphs us that he thinks it will prove an extremely severe test for both men and cars.

the eight hours' trial, &c. The main features of the programme and rules are as follows :—

Monday, May 9.—Weighing and inspection of the cars.
Tuesday, May 10.—Eight hours' trial, followed by inspection.
Wednesday, May 11.—Hill-climbing trial near Ramsey.
Thursday, May 12.—Acceleration and speed trials, Douglas.

Drivers will be permitted prior to the race to run their cars round the course in order that they may become acquainted with its nature, but the Automobile Club Racing Committee wisely insist that the cars shall be fitted with efficient silencers and may only be driven on the road between day-break and 7 a.m., all driving being prohibited on Sunday. The weighing and inspection will take place at Douglas next Monday, when the judges will have to be satisfied that the cars are entirely constructed and all their parts manufactured in the United Kingdom, and will see that they conform to the rules as to the direction of the exhaust. Each car will be required to have its official racing number painted in a distinctive colour and placed in four places, viz.. on each side, in front and behind. The trial is not a race, but intended to be :—

(*a*) A high speed reliability trial, including :
(*b*) Speed tests against time over half a mile on the flat in each circuit.
(*c*) Speed tests against time in climbing a hill in each circuit.
(*d*) Acceleration tests from rest and stopping observations.
(*e*) Observation of the skill and suitability of the driver.
(*f*) Examination of condition of cars at termination of trial.

The course will be divided into sections, a maximum and minimum time being fixed for each section. Although no advantage will be gained by arriving under the minimum time, if the maximum time be exceeded the fact will be noted.

The first car, as we stated last week, will start at 9 a.m. on Tuesday, May 10th, from the railway crossing close to Quarter Bridge, about one mile west from the town of Douglas. The following is the order in which they will be sent off at five minutes intervals, together with their official racing numbers :—

			lbs.
1.	Mr. J. W. Stocks (Napier)	Weight	2111
2.	M. Edmond (Darracq)	,,	2219
3.	Mr. John Hargreaves (Napier)... ...	,,	2199
4.	M. Henri (Darracq)	,,	2205
6.	Mr. Clifford Earp (Napier)	,,	2177
7.	Mr. Campbell Muir (Wolseley) ...	,,	2191
9.	Mr. S. F. Edge (Napier) ...	,,	2144
10.	Mr. Sidney Girling (Wolseley)... ...	,,	2157
11.	Mr. A. Rawlinson (Darracq)	,,	2205
12.	Mr. Chas. Jarrott (Wolseley)	,,	2163
14.	Lieut.-Colonel Mark Mayhew (Napier)	,,	2182

If within one minute of the word to go being given a car does not start, the driver must retire to the side of the road and take his turn after all the other cars have departed, the time occupied in any adjustments being noted.

Warnings on the route will be noted by flags as follows :—

Small triangular green flags signify "Drive with caution for 440 yards (a quarter of a mile)."

Large green flags signify "Corner to be negotiated in 300 yards."

Large red and green flag signifies "Stop in 300 yards."

Large red flag means "Stop."

The controls are practically as we mentioned last week, except that Ballasalla and Castletown will be treated as one control, as also Willaston Corner to Quarter Bridge, whilst Ballaugh Corner will be regulated by the special caution flag to "slow down," instead of actually stop. The total distance as shown in our map round the circuit, including the controls, is 51 miles 1 furlong. The controls are as follows :—

	Mls.	Fgs.	Mins.	
1. Ballasalla (inward) to Castletown (outward)	1	3	4	The town of Castletown is 1 mile 3 furlongs from the beginning of the control.
2. Foxdale (stop and start)	—		—	For the purpose of negotiating railway bridge.
3. Kirkmichael ...	0	4	2	Control extends through village.
4. Ramsey	0	4	2	Through the outskirts of the town.
5. Willaston Corner to Quarter Bridge	1	4	3	Passing through no villages but on a winding road. Outward end of the control at Quarter Bridge.

Any adjustments or repairs must be made during running time, and not in the times allowed for controls, and cars must not arrive at the end of a control before the expiration of the minimum time. If assistance beyond the driver and mechanic is required, any such assistance must be rendered within a control, or, if carried out *en route*, the employment of such extra assistance must be reported fully at the next stopping control.

The order of the arrival of cars at the end of a circuit need not necessarily affect the result of the trials, and, in order to prevent any attempt to make it appear that the first car to arrive at a point is necessarily better than any other car, the marshals at controls have absolute discretion as to the order in which cars shall leave any control.

Fuel, water, and oil can only be taken on board within the Ramsey control at the outward end. If taken on elsewhere they must be at once reported.

During each circuit there will be two speed tests—first, a half mile on the flat, commencing about one mile after passing Ballaugh Old Church. Visitors should note where this point is on our map, as Ballaugh New Church, which is some considerable distance before the Old Church, is also an extremely ancient structure, and may easily be mistaken by the uninitiated for the more ancient edifice. The second speed test will be on the Snaefell Mountain Road, commencing from a standing start at the outward Ramsey control, and finishing at a point 2 miles 480 yards beyond, giving a rise approximately of 1,019 feet. This point is also specially indicated on our map. Passing will be permitted on both these stretches, but otherwise passing will not be permitted except in controls by the direction of the Control Marshal, or on the road in the case of a car being in obvious difficulties.

Tuesday's trial will be a run of eight hours, including the control times for each car, after which it will be stopped at the finishing point at Quarter Bridge on next arriving there.

Acceleration will be tested at a point to be fixed and announced hereafter, by noting the time occupied in covering distances, which will vary on each circuit, from a standing start. This will be effected by the starter standing at some distance from the starting point, dropping a flag as the starting signal, and noting the time elapsing between the dropping of the flag and the car passing him.

Observations as to stopping will be confined to noting the accuracy with which the drivers stop their cars between the two white lines placed at the entrance to each control.

In selecting the team consideration will be given to the skill and suitability of the drivers, as demonstrated in the acceleration tests, in the accuracy of coming to rest on entering controls, in speed tests, in promptness in getting away from controls on the word to start being given, and in the general management of their cars.

After the day's run the cars will be carefully examined by the judges. The same ratio of gears used in these Eliminating Trials need not necessarily be the same which will be ultimately used on the Taunus Course, but no alteration must take place during the four days' event in the Isle of Man.

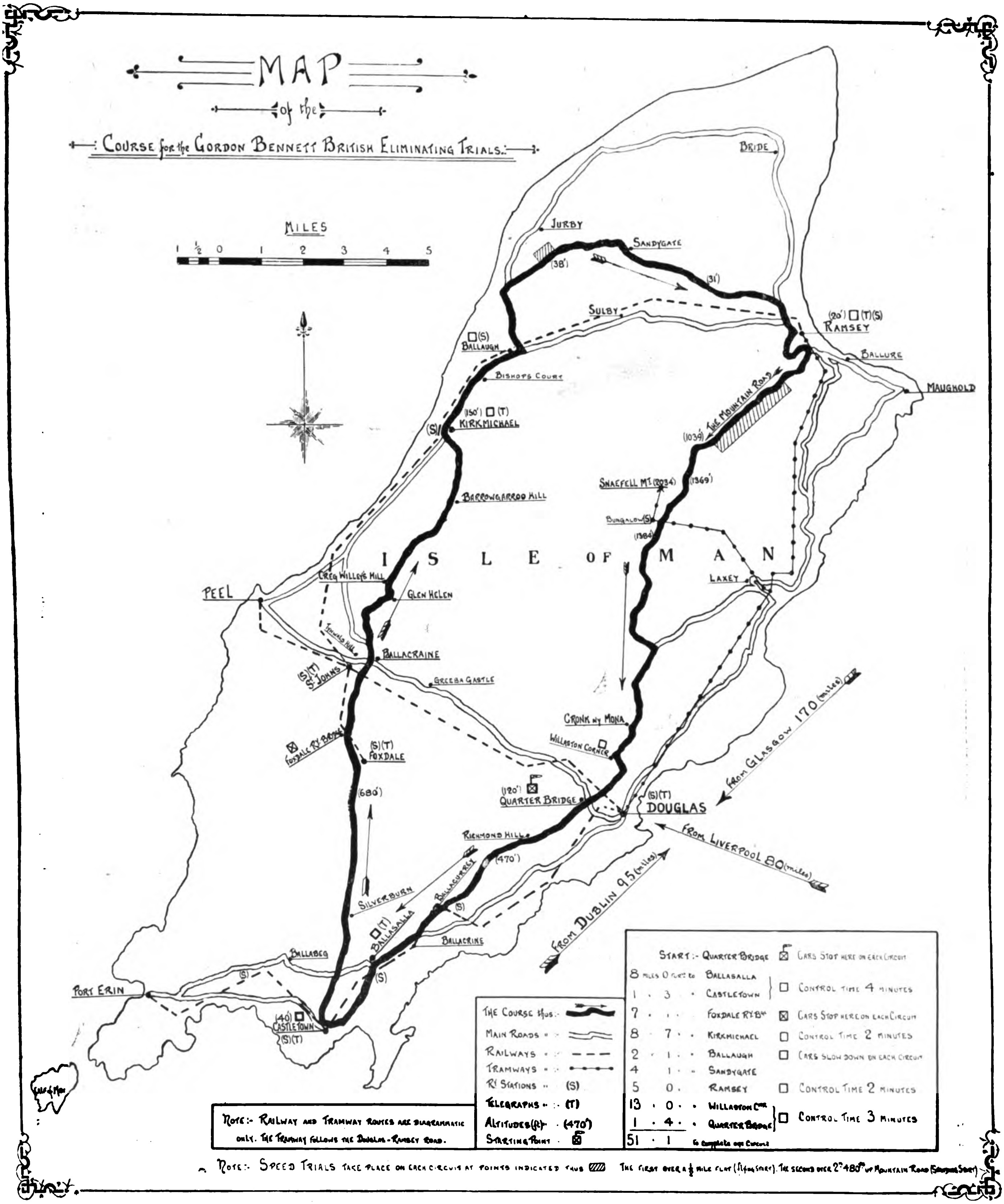
The Hill-Climbing Test near Ramsey will commence at 3.30 p.m. on Wednesday, May 11th. A competitor who does not take part in, or who is late for this hill climb, may be disqualified from selection for the Gordon-Bennett team.

The acceleration and speed tests on the Parade, Douglas, will take place on Thursday, May 12th, commencing at 12 noon, when all competitors will be required to take part. The cars will be timed from a standing start, and after a run of a quarter of a mile will be timed over a flying kilometre.

After these Selection Trials three cars and drivers, and reserve cars and drivers, will be chosen by the club, it being understood that—contrary to the rules governing the Eliminating Trials of 1903—the Selection Trials of this year are held simply for the guidance of the club in making their choice, and the winners of the Selection Trials will not necessarily be selected to represent the club in the race.

GORDON-BENNETT ITEMS.

A vast amount of disappointment was felt in French automobile circles, when it began to leak out about the middle of last week, that the French authorities had determined to reduce the circuit for the French Eliminating Trials from 124 kiloms. to about 93·650 kiloms., and to vary the course accordingly. The French Minister of Interior has laid down certain rules to be observed and restrictions in regard to stopping points and neutral areas, which has rendered this change absolutely necessary. The start and finish will probably, therefore, be from Mazagran, the new circuit touching the points



MAP of the Course for the Gordon Bennett British Eliminating Trials.

THE Course thus:-	
MAIN ROADS " "	
RAILWAYS " "	---
TRAMWAYS " "	•—•—•
Ry. STATIONS "	(S)
TELEGRAPHS " "	(T)
ALTITUDES (ft) "	(470')
STARTING POINT "	☒

START:- QUARTER BRIDGE ☒ CARS STOP HERE ON EACH CIRCUIT

8 miles 0 furs. to	BALLASALLA		
1 " 3 "	CASTLETOWN	☐	CONTROL TIME 4 MINUTES
7 " "	FOXDALE RY. BDG.	☒	CARS STOP HERE ON EACH CIRCUIT
8 " 7 " "	KIRKMICHAEL	☐	CONTROL TIME 2 MINUTES
2 " 1 " "	BALLAUGH	☐	CARS SLOW DOWN ON EACH CIRCUIT
4 1 " "	SANDYGATE		
5 0 "	RAMSEY	☐	CONTROL TIME 2 MINUTES
13 " 0 " "	WILLASTON CNR.		
1 " 4 " "	QUARTER BRIDGE	☐	CONTROL TIME 3 MINUTES
51 " 1	to complete one Circuit		

NOTE:- RAILWAY AND TRAMWAY ROUTES ARE DIAGRAMMATIC ONLY. THE TRAMWAY FOLLOWS THE DOUGLAS-RAMSEY ROAD.

NOTE:- SPEED TRIALS TAKE PLACE ON EACH CIRCUIT AT POINTS INDICATED THUS ▨ THE FIRST OVER A ½ MILE FLAT (Flying Start). THE SECOND OVER 2m. 480yds. UP MOUNTAIN ROAD (Standing Start).

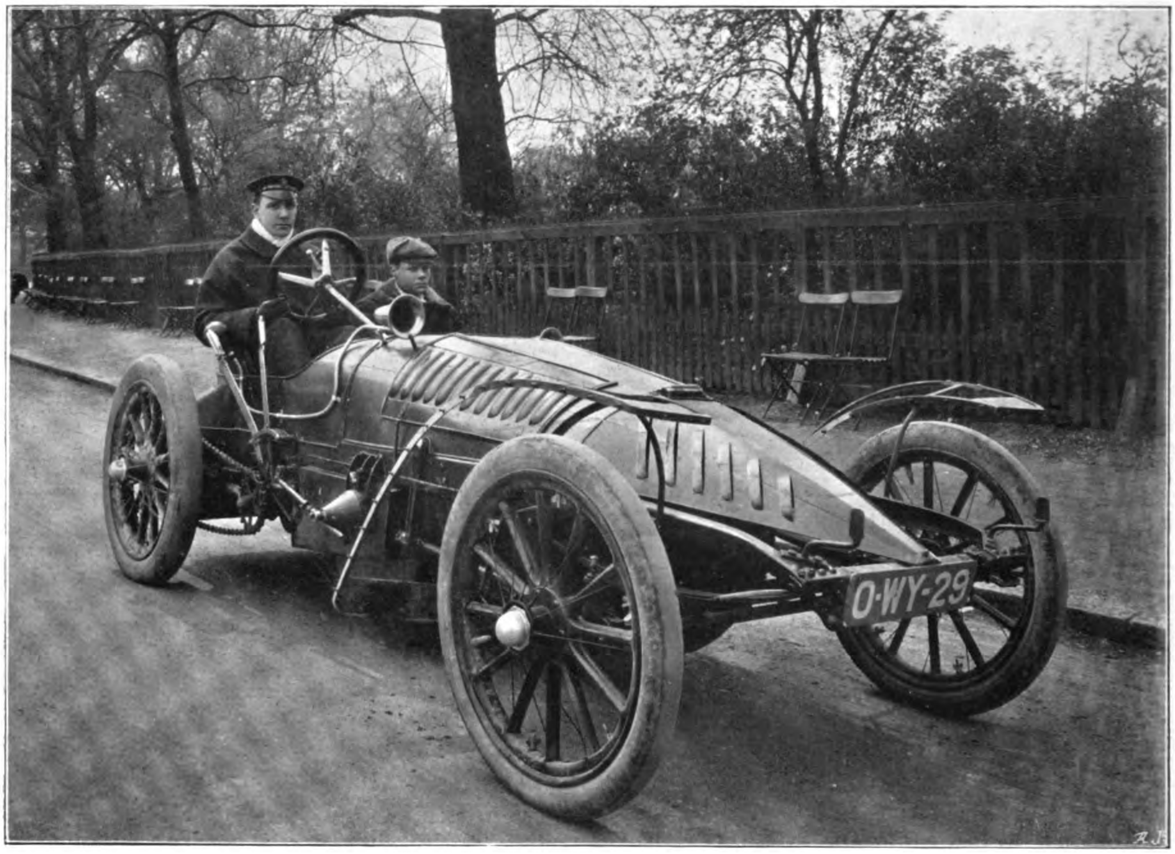
at Vouziers, Le Chesne, Novy Chevrieres, and Rethel. The weighing formalities will take place on May 19th. In the event of the whole of the entered French vehicles being run on this circuit there should be plenty of excitement for the spectators, as thirty racers careering round a circuit of 90 kiloms. is likely to bring about some fairly close finishes at the controls. The balloting for starting places took place on Tuesday last.

Curiously, the De Dietrich house, as in Paris-Madrid, again drew No. 1. Gabriel will drive this car and will, therefore, lead off in the Trial. Charles Jarrott will start 11th, also on a De Dietrich. The order of starting each firm's cars is as follows: De Dietrich, 1st, 11th, 21st; Darracq, 2, 12, 22; Bayard-Clement, 3, 13, 23; Hotchkiss, 4, 14, 24; Richard Brazier, 5, 15, 25; Serpollet, 6, 16, 26; Mors, 7, 17, 27; Panhard-Levassor, 8, 18, 28; Gobron, 9, 19, 29; Turcat Mery, 10, 20.

The following further particulars have come to hand concerning the new Panhard-Levassor racers. The engine has four cylinders, the jackets around which are of copper. The inlet-valves are mechanically operated, and a high-tension system of magneto-ignition is employed. The radiator is cooled by a fan, and the engine is nominally of 100-h.p. The change-speed-gear provides four forward speeds and a "reverse," and is constructed in such a way that when the top gear is in use there is a direct-through-drive, and the lay-shaft remains stationary. The car is geared to about 90 miles per hour. The foot-brake is fitted between the gear-box and the propeller-shaft, and the hand-operated brakes on the rear hubs are of a new type. Ball bearings are used throughout the transmission-gear. The chassis has a pressed-steel frame.

The performances of the Mors racers will be watched with special interest owing to the fact that, in the design of the engines, an important departure from ordinary practice has been made. The cylinders are not placed immediately above the crank-shaft, although their axes are vertical. There is thus a displacement in position of the usual dead centres at the ends of the piston-strokes, and a more nearly tangential thrust is secured for the connecting rods. The crank-shaft, of course, revolves right-handedly when regarded from the front, and the cylinders are somewhat closer to the "near" side of the vehicle than to the "off" side. This arrangement is, of course, not new, either in stationary engine work or even for automobile engines, for although it is not the usual practice, yet it has been adopted on the Duryea cars for some time.

An official appeal has been issued by the German Automobile Club to the "corresponding" clubs represented in the race, urging that every consideration shall be given to the safety of the populace when driving over the course. It is feared that in the event of any serious mishap occurring prior to the race, that there might be a possibility at the last moment of permission being with-

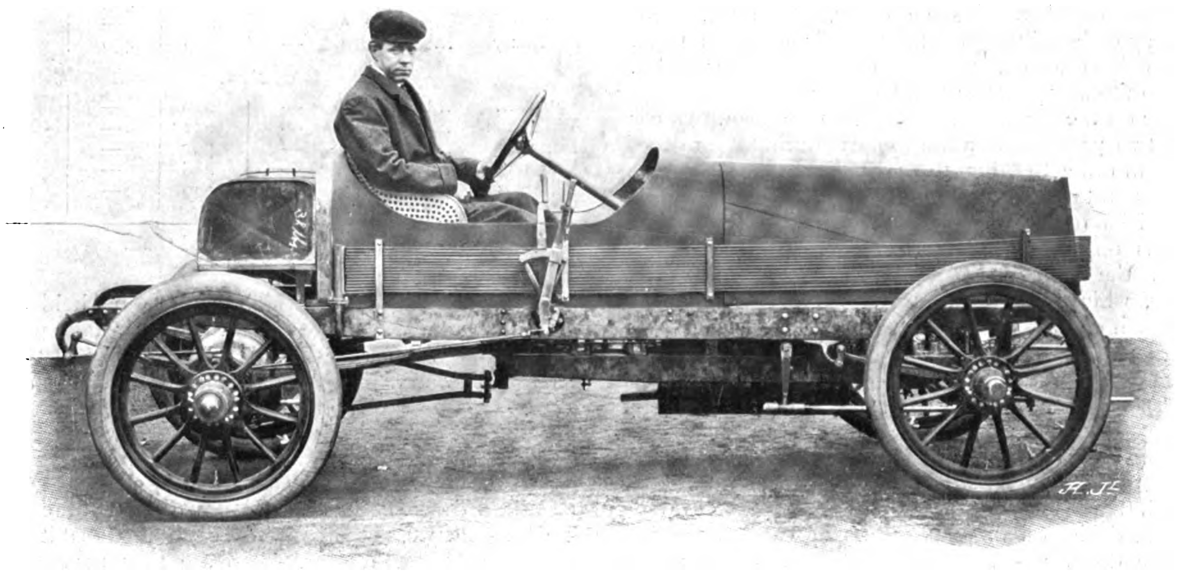


GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Mr. Charles Jarrott on his 96-h.p. Wolseley "Beetle," which he will drive next week in the Isle of Man. By his side is his trusty mechanician, Bianchi, who occupied the same place last year during the Gordon-Bennett Race, when the accident occurred which placed both hors de combat.

drawn to run the race at all. For the day of the race it is reported that the country within ten kilometres of the Saalburg will be enclosed by the authorities, and that a charge of £1 will be made for admission within the prescribed area.

The Benz-Parsifal cars have now been, it is again reported, withdrawn from the race for representing Germany, and, as anticipated a short time ago, the third car to represent Germany in the race is therefore to be an Opel-Darracq.

Although the date for entries for the American team was postponed until May 1st, nothing certain even now appears to be known in regard to how the American team will be constituted. The Peerless Company undoubtedly will be the chief representatives, and Mooers is, without question, a driver on their behalf. Alexander Winton has come forward with his No. 2 Bullet, Barney Oldfield being probably reinstated to take charge of this car. The Hewitt vehicle, it has been rumoured, after all would be ready at the date specified for selecting the cars, and even the Harkness car has been spoken of as likely to make its appearance unexpectedly for the team. In addition, a newcomer, Walter Christie, is reported to have entered the 30-h.p. "Christie" car which he drove in the 10 mile open race for gentlemen drivers, at Ormonde Beach races, last January, his time being 9 mins. 35 secs.



The 50-h.p. Peerless Racer with L. P. Mooers at the wheel. This car is entered for the American Gordon-Bennett team.

We are now able to give a few further particulars concerning the Peerless racer over and above those mentioned last week. The appearance of the car is shown in an accompanying illustration, and here the shape of the body, which resembles an inverted canoe in front, is well seen; this comes to a sharp edge in front. The vehicle is lighter and has a less powerful engine than their racer of last year, and it is also built with a lower centre of gravity, although—even now—it is not of exceptionally low build. Its weight appears to be about 1,800 lbs., and the engine is said to develop about 50 h.p. The engine and the change-speed-gear are mounted upon an underframe, which, like the main frame to which it is fixed, is constructed of pressed steel. There are no side radius rods between the live-rear-axle and the main frame, but a forked stay-rod is secured centrally to the casing surrounding the differential gear, and is at its forward end connected through buffer springs with the frame. The speed of the engine is controlled from two levers above the steering wheel, these acting as usual on the throttle and on the timing device, respectively. Probably the most curious feature of the car is the construction of the radiator, which consists of sixteen $\frac{5}{16}$-in. copper tubes, that are arranged one above the other around the front portion of the body, following its outline, and coming to a sharp edge forward. These tubes are connected with the water tank, that lies immediately behind the driver's seat, and the water is circulated through them by a gear-driven pump. About 6½ gals. of water are carried, and the petrol tank, which lies behind the water tank, holds about 18 gals. It will be noticed that the frame slopes down somewhat in front, and that the gear and brake levers lie outside the body.

The headquarters of the Wolseley racing cars in the Isle of Man, from May 7th to 14th, will be the Falcon Hotel, Douglas.

Both the Napier and the Wolseley cars which are competing in the eliminating trials in the Isle of Man will be fitted with Dunlop motor tyres. As a number of automobilists are crossing to the island for the motor week, it would be as well for them to note the central agencies for Dunlop tyres on the Island where various sizes of motor, motor cycle, and cycle tyres are stocked. These are :—Messrs. J. and W. White, Prospect Hill, Douglas; Messrs. Brooke and Co., Parliament Street, Ramsey; and Mr. T. W. Ratcliffe, Castletown Engineering Works, Castletown.

The Vacuum Oil Company have made arrangements with several leading firms in the Island to have a full stock of their vacuum mobiloils and greases. Nearly all these agents, in addition, also supply motor spirit, and are prepared to effect repairs and give garage accommodation. They are: M. Hampton, 60, South Quay, Douglas; the Villiers Hotel, the Promenade, Douglas; J. R. Corlett, Victoria Street, Douglas; F. Gash, 9, Castle Street, Douglas; and Brooke and Co., Parliament Street, Ramsey.

SIDE-SLIP TRIALS OF THE A.C.G.B.I.

On Friday, April 29th, all the cars and cycles still remaining in the competition took part in a power-absorption test in the neighbourhood of Potter's Bar. The hill selected as the scene of operations was situated a short distance off the Great North Road, which runs through the village. All the competing cars arrived at the spot at about 12.30 p.m., and the test was immediately commenced. Each car was started from a fixed point just over the brow of the hill, and allowed to run down free (clutch out) until it came to rest at some point up the next incline, this latter point being officially noted by the hon. observer of each car. The only passengers in the cars during these trials were the driver and one of the judges, the judges being Professor C. V. Boys, Major Lindsay Lloyd, and Mr. Worby Beaumont. Each car was first sent down with its non-skid device on, then twice with the device off, and finally with the device on again once more. Those cars having a non-detachable device had to fit a plain-tread tyre to replace those having the non-skid attachment.

Exceptions to the above rules were made in the case of the Vivian and Wilkinson devices, which were sent down only once, with and without their non-skid tyres. This was also the arrangement for all the motor cycles. Owing to the fact that the Hunt device was found to be not quite on the ground after its first run down, this car carried two passengers in the tonneau during the rest of its trials in order to bring the rear of the car, where the device was fitted, nearer the ground.

No official results nor full data are as yet available, and it is impossible for us to make any comparison between the various devices. We append a table, however, which gives the extra distances (unofficial) which each car travelled with and without its non-skid device, such distances being measured from the spot at which the car travelling the shortest distance came to rest. In view of the fact that hardly two cars stopped, even approximately, at the same place—under similar conditions of running—these figures are, of course, useless as a comparison between various devices, although they may give some idea as to the effect of any particular device on its own particular car. The effect of non-skid devices—in point of absorption of power—is evidently of no great magnitude when measured by a test of this nature. Such as it is, however, it is of course made to appear greater, the better the free running condition of the car to which it is fitted. Consequently an accurate measurement of the power absorbed by the car itself would be absolutely essential before the other measurements can be reduced to a common basis for comparison. Cycles are not likely to differ to such an extent as cars in this matter, but in these the comparative wind resistance adds an equally serious element, as will be seen from the fact that the rider of one of these bicycles was able to travel 220 feet with the device on, and 150 feet with the device off, in excess of the distance reached by any other competitor, probably because he was the only one who bent well forward over his handle bars.

The fact, too, that three of the competing cars, fitted with mechanical devices, actually went further with than without their attachments, would appear to show that under ordinary running conditions the power absorbed in such devices is not so great as some people imagine. Our table is arranged in no particular order, and we would repeat that the figures form no basis for comparison until they have been analysed by the aid of the necessary data, such as are presumably in the hands of the judges, but concerning which we have, as yet, no real information.

Name of Device.	Device On.		Device Off.		Extra Distance with Device Off*
	1st Trial.	2nd Trial.	1st Trial.	2nd Trial.	
	feet.	feet.	feet.	feet.	feet.
Cars.					
Vivian... ...	381	—	346	—	35
Buller	377	391	463	463	79
Wilkinson ...	412	—	398	—	14
L'Empereur ...	187	190	273	298	97
Billet	104	0	203	—	162
Hunt	386	341†	459	225†	73 71†
Rourke ...	20	12	158	412	141
Parsons ...	320	364	380	—	55
Nicholson ...	531	525	439	413	- 89
Cavendish ...	469	491	433	—	- 73
Sainsbury ...	435	—	399	456	- 36
Bicycles.					
Bates	265	—	279	—	10
Wilkinson ...	211	—	211	—	0
Empire ...	178	—	321	—	143
Parsons ...	437	—	488	—	51
Edwards ...	136	—	349	—	203

* Mean result of 1st and 2nd trials.
† With four passengers.

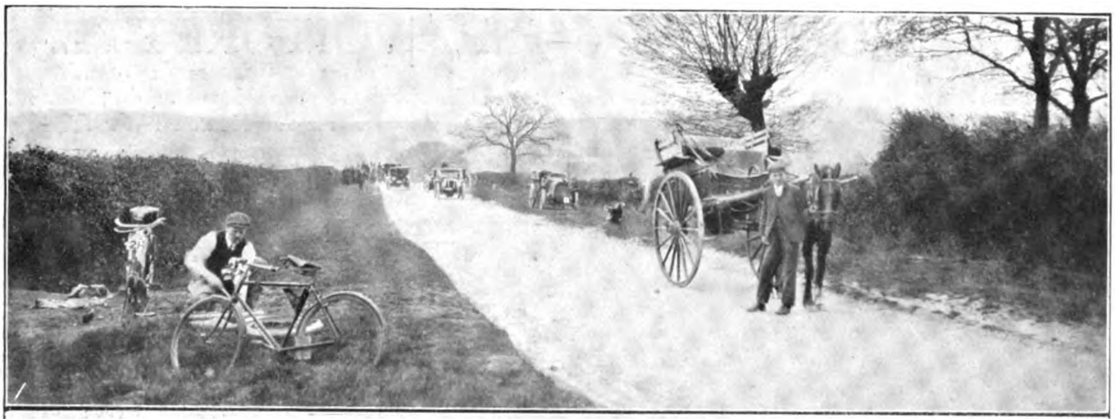
The "slipping" tests, which were to be held at the Talbot Works, Ladbroke Grove, will now take place at the Locomobile Garage Riding School to-day (Saturday), as the Talbot Works track, unfortunately, will not be ready. A preparation of soft soap will be used for making the surface slippery.

* * *

When describing the British-built Darracq racers in a recent issue, we, not unnaturally, concluded that it was the splendid Michelin tyres, which are now turned out by the North British Rubber Company, that were being fitted to these cars, for this company is, as is well known, the great licensed manufacturers of the Michelin tyres in this country. Messrs. A. Darracq and Co., however, write us that this is not the case, and add:—

> "The tyres were made in London, specially for us, by Messrs. Michelin and Co., of Clermont-Ferrand (France), under the personal supervision of Mr. Wolff, brother-in-law of M. Michelin. The rims of the wheels are of special design, and are detachable, so that altogether the tyres are different from the usual pattern."

The German Automobile Club inform us that a brilliant gathering of exalted personages will favour the Gordon-Bennett week by their presence in Homburg and the immediate neighbourhood. Chief amongst these is Prince Henry of Prussia, the patron of the German Automobile Club, the Grand Duke of Mecklenburg Schwerin, the Dowager Duchess Anastasia, patroness of the German Automobile Club, the Grand Duke of Hesse, Prince and Princess Friedrich Leopold of Prussia, Prince Albrecht of Prussia, and Prince and Princess Friedrich Carl of Hesse.



ANTI-SKID TRIALS OF THE A.C.G.B.I.—The Resiliency Tests at Potter's Bar on April 29.

1.—A view from the highest point of the Hill.

2.—No. 1 starting to descend by gravity, with device on. Mr. Basil Joy, the Technical Secretary, giving the word "Go."

3.—At the top of the Hill. Watching the Cars descend. 4.—Observers awaiting the Cars at the other end.

THE WOLSELEY 6–H.P. VOITURETTE.

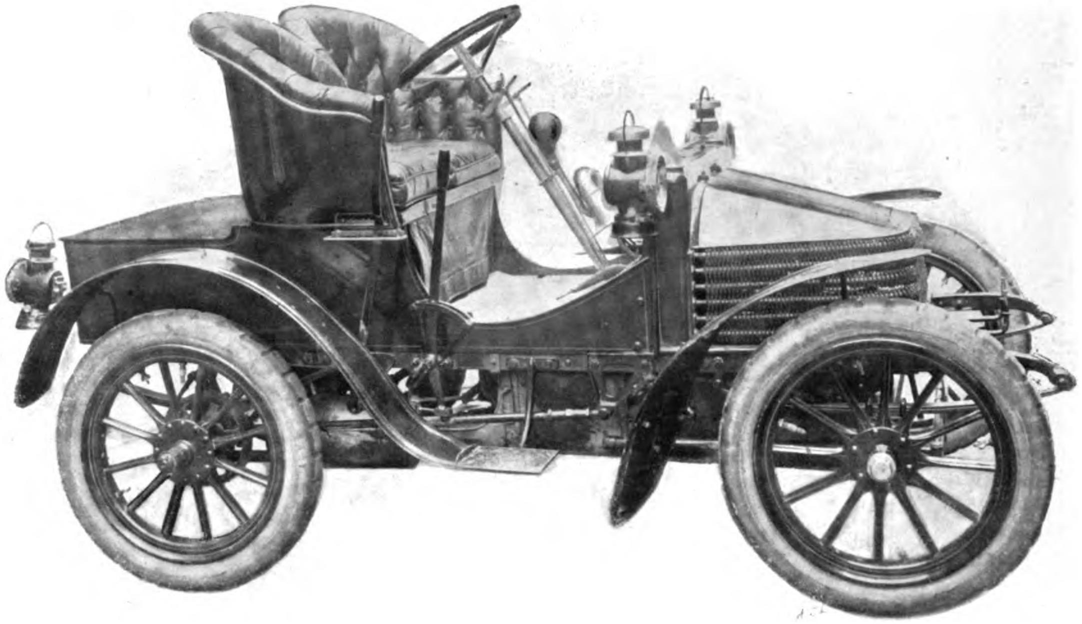


FIG. 1.—View of the Wolseley 6-h.p. Light Car from the right side.

IN many respects the little 6-h.p. car which the Wolseley Company have put upon the market is quite the most successful attempt which has hitherto been made to meet the needs of those who require a thoroughly sound vehicle at a very low price. In many ways the special system employed in all the Company's larger vehicles adapts itself well, with but comparatively few modifications, to the design of a light car, and the makers have therefore been the better able to take full advantage ot their wide experience in the drawing office, in the shop, and on the road, with the result that this little car is extremely well calculated to suit a very large number of intending motorists who have for some time been on the look-out, but have waited, for a British-built vehicle of this kind. As we have said, its design, in the main, resembles the larger cars with which the Wolseley Company have built up so enviable a reputation for them-

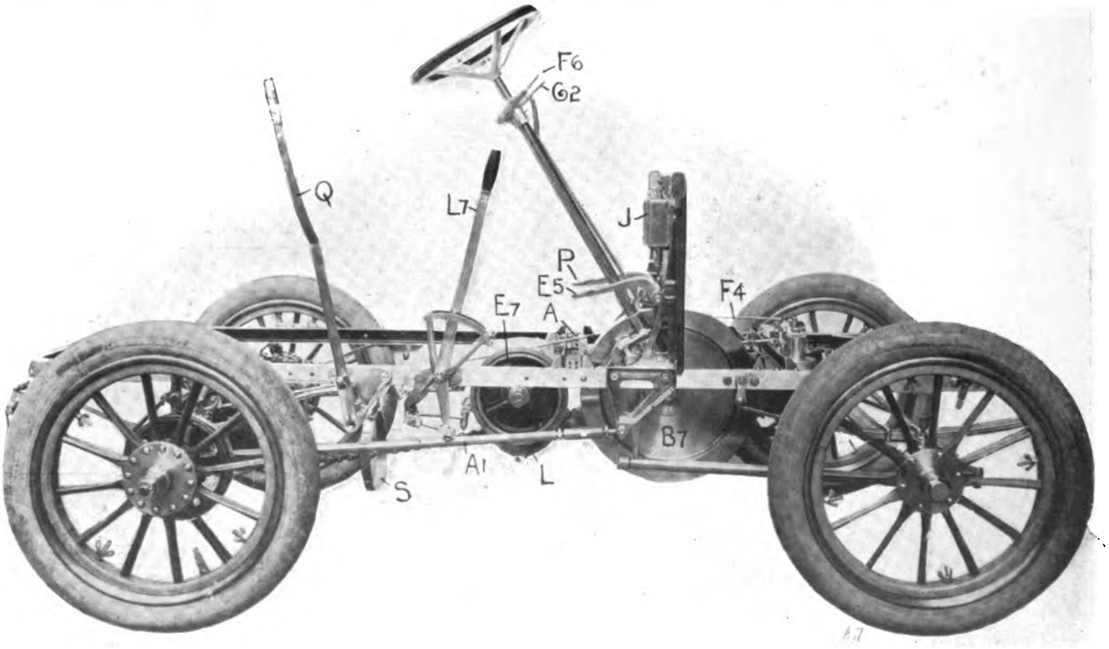


FIG. 2.—Side view of the 6-h.p. Wolseley Chassis from the right.

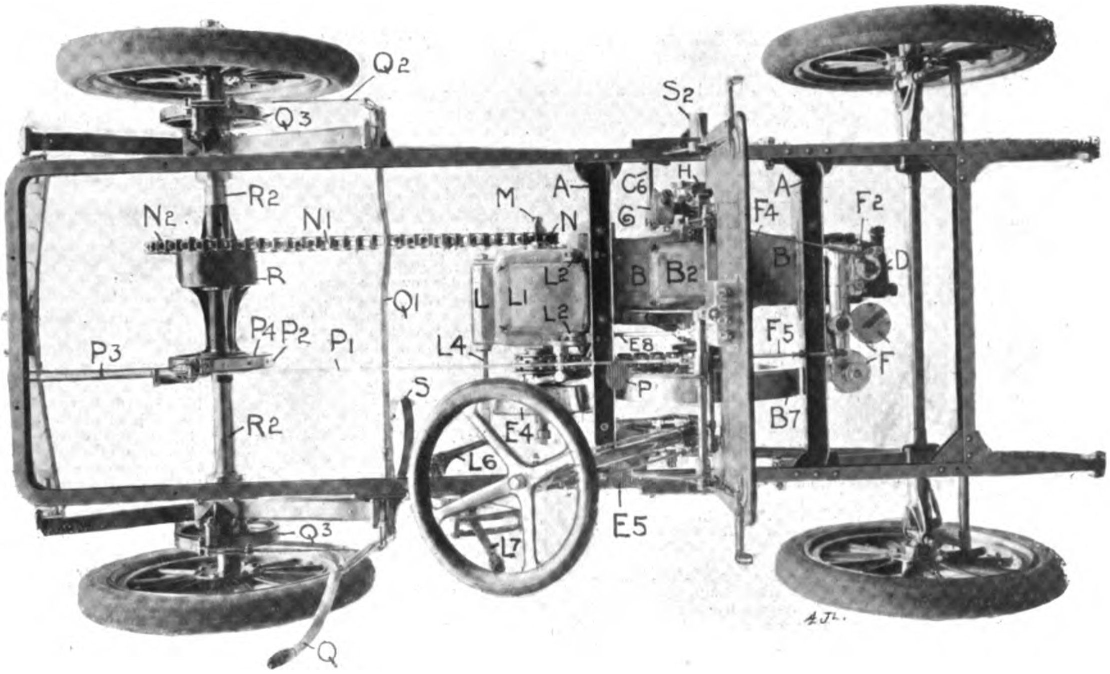


Fig. 3.—View of the 6-h.p. Wolseley Chassis from above.

selves. But, in order to reduce the cost of construction, the means adopted for transmitting the power to the driving-wheels has been entirely altered—a single chain, in conjunction with a live-rear-axle, having been substituted for the ordinary drive by side-chains to road wheels revolving on a stationary axle. The car not only has a good appearance, but, with its comfortable two-seated body, there is ample space provided for tools, spare parts, and luggage, although every portion of the driving mechanism has been rendered conveniently accessible, and the tanks can be replenished without disturbing either the driver or his fellow-passenger. A third seat, in the form of a "spider," can also be added behind, for those requiring the additional accommodation. The construction throughout is decidedly substantial, and yet the weight is only about 8½ cwt., so that the cost of upkeep should be small, although a high average speed can be maintained, and the car is a good hill-climber. Low price has not been obtained at a sacrifice of either good design or high finish, and as

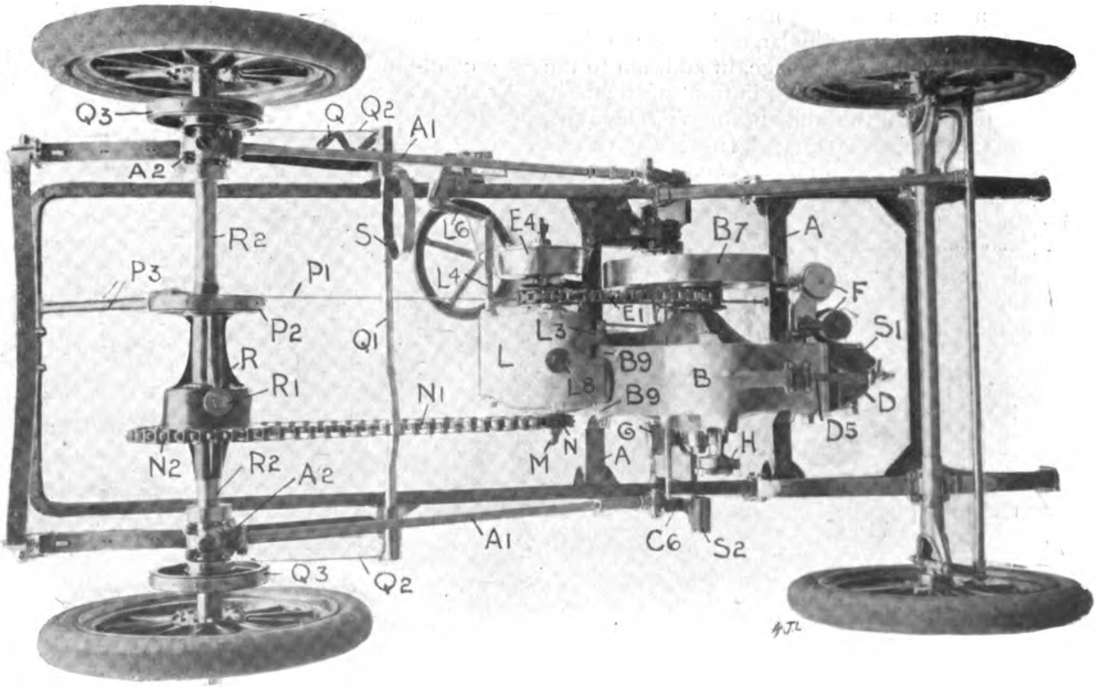


Fig. 4.—View of the 6-h.p. Wolseley Chassis from below.

The Main Frame.

A	Intermediate transverse members.
A^{1}	Adjustable radius rod.
A^{2}	Self aligning bearings for back axle.

The Engine.

B	Crank-chamber casting.
B^{1}	Main bearing caps.
B^{2}	Detachable cover.
B^{3}	Cylinder liner.
B^{4}	Crank-shaft.
B^{5}	Oil-tight fulcrum.
B^{6}	Spur-wheel.
B^{7}	Flywheel.
B^{8}	Spiral gear-wheel.
B^{9}	Hinge-lugs for gear-box.
B^{10}	Centrifugal oil ring.

The Valve-Gear.

C	Cam-shaft.
C^{1}	Exhaust-cam.
C^{2}	Spur-wheel.
C^{3}	Half-compression-cam.
C^{4}	Valve operating-lever.
C^{5}	Roller on C^{4}.
C^{6}	Half-compression sliding-rod.
C^{7}	Oil well.

The Combustion-Chamber.

D	Cylinder head.
D^{1}	Inlet-valve.
D^{2}	Exhaust-valve.
D^{3}	Ignition-plug socket.
D^{4}	Exhaust-valve spindle.
D^{5}	Leaf-spring for exhaust-valve.
D^{6}	Piston.
D^{7}	Brackets carrying gudgeon-pin.

The Chain-driven Main Clutch.

E	Sprocket on crank-shaft.
E^{1}	Renolds silent chain.
E^{2}	Chain-wheel on clutch-shaft.
E^{3}	Thrust-collar.
E^{4}	Clutch-shell.
E^{5}	Clutch-pedal.
E^{6}	Ball-thrust bearing.
E^{7}	Clutch cone.
E^{8}	Clutch operating-rod.
E^{9}	Bell crank for ditto.
E^{10}	Clutch spring.

The Carburettor and Throttle-Valves.

F	Carburettor.
F^{1}	Induction-pipe fitting and throttle-valve.
F^{2}	Throttle-valve-lever.
F^{3}	Foot-controlled throttle-valve.
F^{4}	Rod to hand-controlled throttle.
F^{5}	Rod to foot-controlled throttle.
F^{6}	Hand lever controlling throttle-valve.

The Ignition Apparatus.

G	Commutator.
G^{1}	Commutator spindle.
G^{2}	Timing lever.
G^{3}	Coil box on dash.
G^{4}	Floor-board above commutator.

The Cooling Water System.

H	Circulating pump.
H^{1}	Pump-spindle.
H^{2}	Filler cap on radiator.

The Engine Lubricator.

J	Sight-feed lubricator.

The First Motion-Shaft of Gear-Box.

K	First motion-shaft
K^{1}	First speed spur-wheel.
K^{2}	Second speed spur-wheel.
K^{3}	Third speed spur-wheel.
K^{4}	"Reverse" wheel.
K^{5}	Intermediate "reverse" wheel.

The Gear-Box and Operating Mechanism.

L	Gear box.
L^{1}	Detachable cover for same.
L^{2}	Chain adjustment screws.
L^{3}	Lugs for hinge to crank-chamber.
L^{4}	Sliding rod for changing gear.
L^{5}	Operating fork.
L^{6}	Operating bell-crank.
L^{7}	Change-speed-lever.
L^{8}	Drain plug.

The Second Motion-Shaft of Gear-Box.

M	Second-motion-shaft.
M^{1}	First speed spur-wheel.
M^{2}	Second speed spur-wheel.
M^{3}	Third speed spur-wheel.
M^{4}	Felt washer.
M^{5}	Groove in sliding-sleeve.

The Chain-drive to Back Axle.

N	Sprocket for roller-chain on second-motion-shaft.
N^{1}	Roller-chain driving back-axle.
N^{2}	Chain ring.

The Foot-Brake.

P	Brake-pedal.
P^{1}	Rod operating foot-brake.
P^{2}	Brake-band.
P^{3}	Ties to frame.
P^{4}	Brake-drum fixed to differential-shell.

The Hand-Brakes

Q	Brake-lever.
Q^{1}	Cross tube for hand-brake.
Q^{2}	Compensating cable for side-brakes.
Q^{3}	Brake-bands.
Q^{4}	Brake-drums fixed to driving-wheels.

The Differential Gear and Live Axle.

R	Differential-gear casing.
R^{1}	Filler-cap for lubricating differential.
R^{2}	Steel tubes fixed to R.
R^{3}	Differential-shafts.
R^{4}	Spur-wheels fixed to R^{3}.
R^{5}	Planet spur-wheels.
R^{6}	Bearing-pins for planets.
R^{7}	Spherical ball-bearings for live-axle.
R^{8}	Inner casting forming hub.
R^{9}	Outer hub-casting.

Sundries.

S	Strap for exhaust-box.
S^{1}	Exhaust-pipe flange.
S^{2}	Socket for starting handle.

Table of Reference Letters for the 6-h.p. Wolseley Car Illustrations.

much care has been taken to render the car durable and reliable as is done on many high-priced vehicles; thus it will be noticed from the description which we are about to give of it that tyres of large size are fitted, that three speeds and a "reverse" are available, that an irreversible form of steering-gear is employed, that a metal shield is fixed beneath the engine and the gear-box, and that the brakes are not only double-acting and powerful, but can be easily adjusted.

A complete car is shown in Fig. 1. Concerning the body, it will be noticed that this has bucket seats, and that there is plenty of room in the large box behind them for carrying a fair amount of luggage, in addition to the tools and spare parts. The bonnet, in front of the dash, is formed by a radiator of the well-known Wolseley type, and the top of the bonnet is hinged so that it can be lifted up out of the way to obtain access to the valves and the carburettor, which lie beneath it. The carriage work is of good finish, and the seats are upholstered in leather.

Three views of the chassis are given in Figs. 2, 3, and 4—Fig. 2 being taken from the right side, Fig. 3 from above, and Fig. 4 from beneath. Probably its most striking feature at first glance is the simplicity of the general arrangement and the compactness of the driving mechanism, for the engine, the main-clutch, and the change-speed gear are arranged close together in front, and there is only the one driving-chain, and the rods operating the brakes, between these members and the back-axle. The other chief characteristics—briefly enumerated—are that the power is transmitted from the crank-shaft of the single-cylinder horizontal engine to the main-clutch by a Renolds' silent chain; that the clutch is fitted on the projecting end of the first-motion gear-shaft; that the silent chain can be adjusted, as to tightness, by rocking the gear-box to the desired extent, in the one direction or the other; that the gear-box has its second-motion-shaft, from the end of which passes the roller-chain that drives the back axle, mounted immediately below the first-motion shaft; that the change-speed-gear is of the sliding spur-wheel type, and is operated by a side lever as on most large cars; that the back axle is so constructed that it revolves in self-aligning ball-bearings; and that easy suspension is ensured by fitting an inverted transverse spring, at the rear, between the frame and the back end of the semi-elliptic side-springs.

The pressed-steel main frame has a **ⵎ** cross-section; its longitudinal side members and the rear member are made in one piece, one straight length being bent round

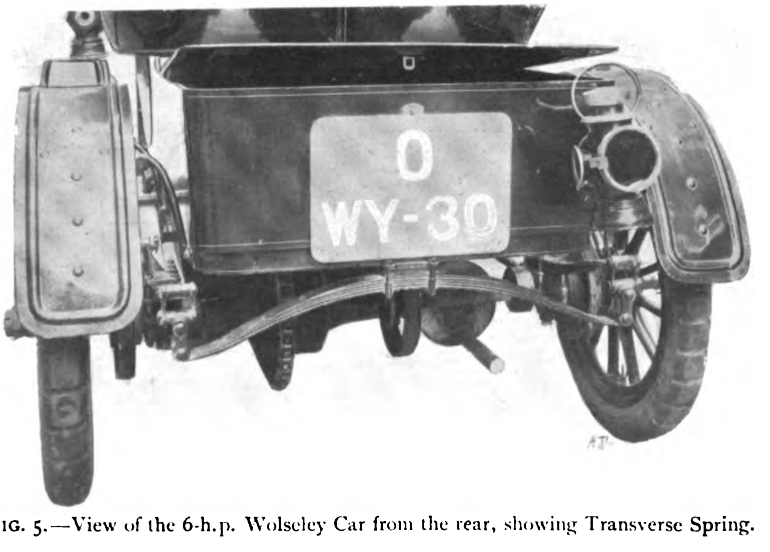


FIG. 5.—View of the 6-h.p. Wolseley Car from the rear, showing Transverse Spring.

to form these three sides of a rectangle. The front member is riveted in place across between the side members, which project forward beyond it to carry the springs; it is further stiffened by angle-plates at the corners. There are also two intermediate cross-members, as seen in the illustrations, and it is to these that the engine and the change-speed-gear are fixed. The front axle is formed by a straight tube, to the ends of which are fixed the brackets that carry the steering heads and provide a support for them at each end. The steering heads have ball thrust bearings, and ball bearings are introduced between the hubs of the front wheels and their stub-axles. The semi-elliptic springs, that support the frame above the front axle, lie immediately beneath its side members. The construction of the back axle will be described at greater length later, and for the moment we need only say that the visible portion of it is rigid with the shell of the differential gear (to which the sprocket wheel is attached), and that the road wheels take their bearings upon the tubular extensions of this casing, so that the weight of the vehicle does not come upon the internal differential shafts. The self-aligning ball bearings, to which we have already referred, are fixed to the centres of the semi-elliptic side springs, and it is the external axle-tubes that revolve in them. These semi-elliptic springs lie outside the main frame, and their rear ends are shackled to the ends of the inverted transverse spring that is fixed centrally to the back of the frame—as shown very clearly in Fig. 5, which is a rear view of the car. The back axle is also connected with the frame by the usual radius rods, A^1, which pass up, each side, from the bearings to neat brackets, that are bolted to the frame, and also serve to carry the dash and the foot-pedals. The rods are hinged at both ends, and are fitted with left and right hand adjustment screws for tightening the roller chain. The wheels, which are all of equal size, are of the artillery type, and are fitted with 28 in. by 3½ in. pneumatic tyres of the Dunlop "heavy" pattern. The car has a wheel base of 5 ft. 6 in., and the track is 4 ft.

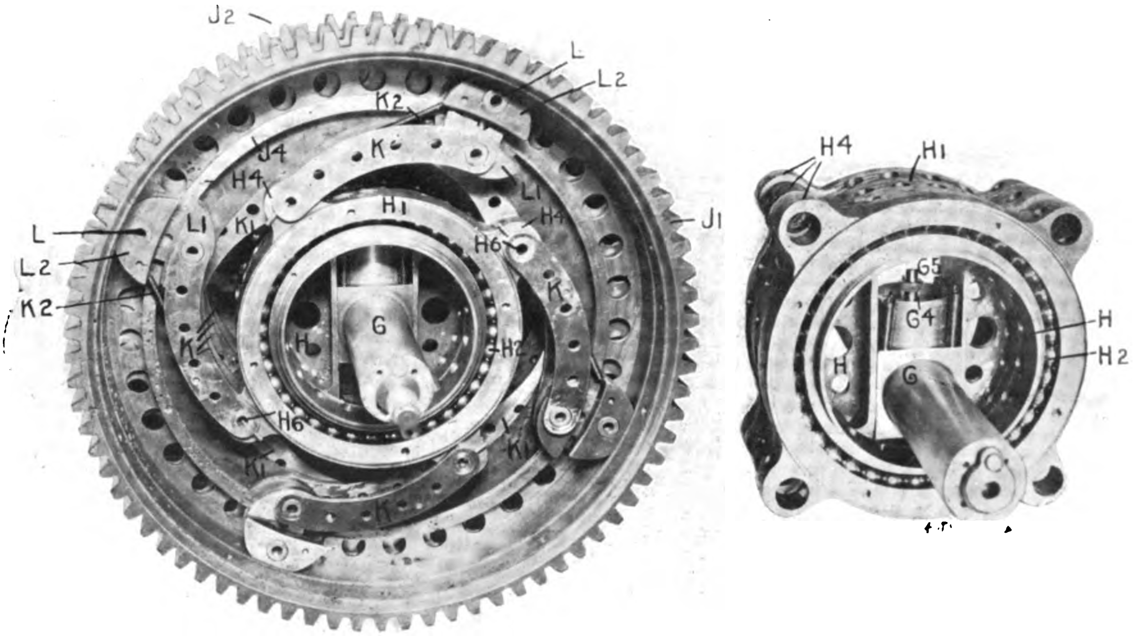
(*To be continued.*)

THE HUTTON PETROL CAR.

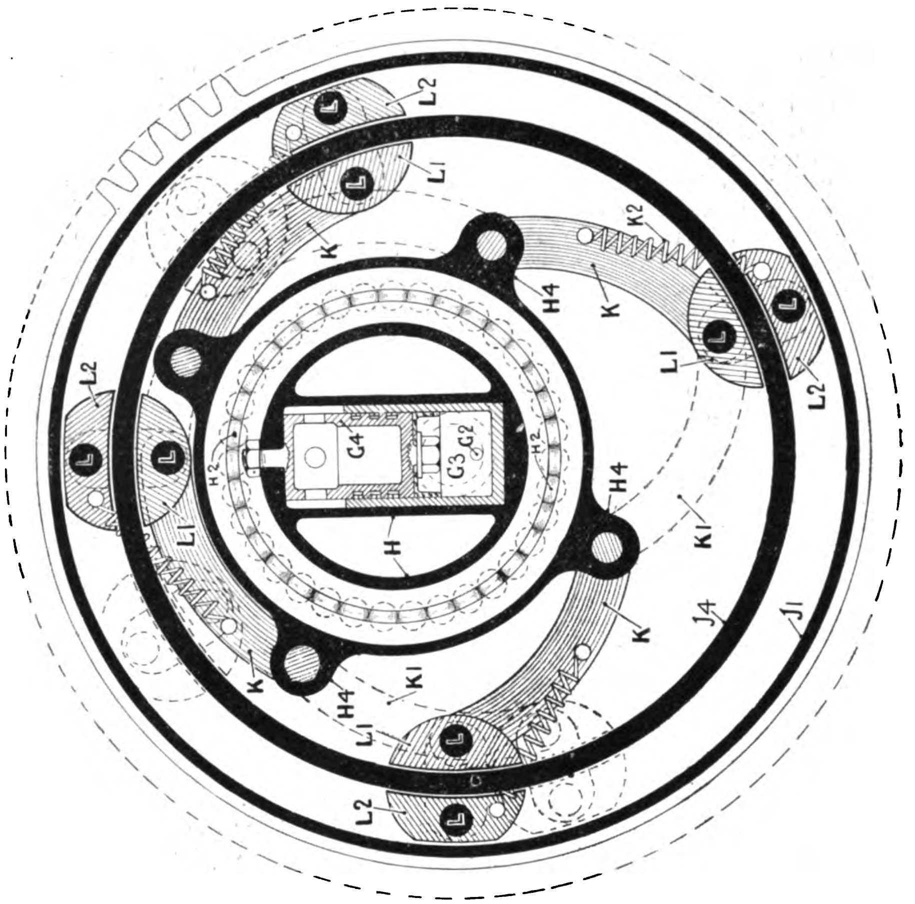
(*Continued from pages* 360, 400, *and* 436.)

The Barber Gradually-Variable Speed-Gear.

THE most striking feature of the Barber gear is that this single mechanism combines the functions of a main-clutch, a change-speed-gear, and a differential-gear in one, in addition to enabling the speed of the car fitted with it to be varied gradually from zero to the maximum without changing the speed of the engine driving it. The general principles upon which the design is based have also been briefly stated by us previously, and it will be remembered that the desired effect is obtained by causing the engine to drive an eccentric, by arranging the eccentric in such a manner that its degree of eccentricity can at any time be varied, and by connecting the eccentric strap with free-wheel clutches in such a way that the motion transmitted from the eccentric to the cluches gives an intermittent series of impulses to the



FIGS. 20 and 21.—Interior view of the Barber Gear, showing the Eccentric, and one set of "Free-wheel" Clutches; and a view of the complete Eccentric with its shaft lying inside it.



The Barber gradually variable Change-Speed-Gear.

FIG. 23.—Transverse cross section on the line 1, 1, in Fig 22.

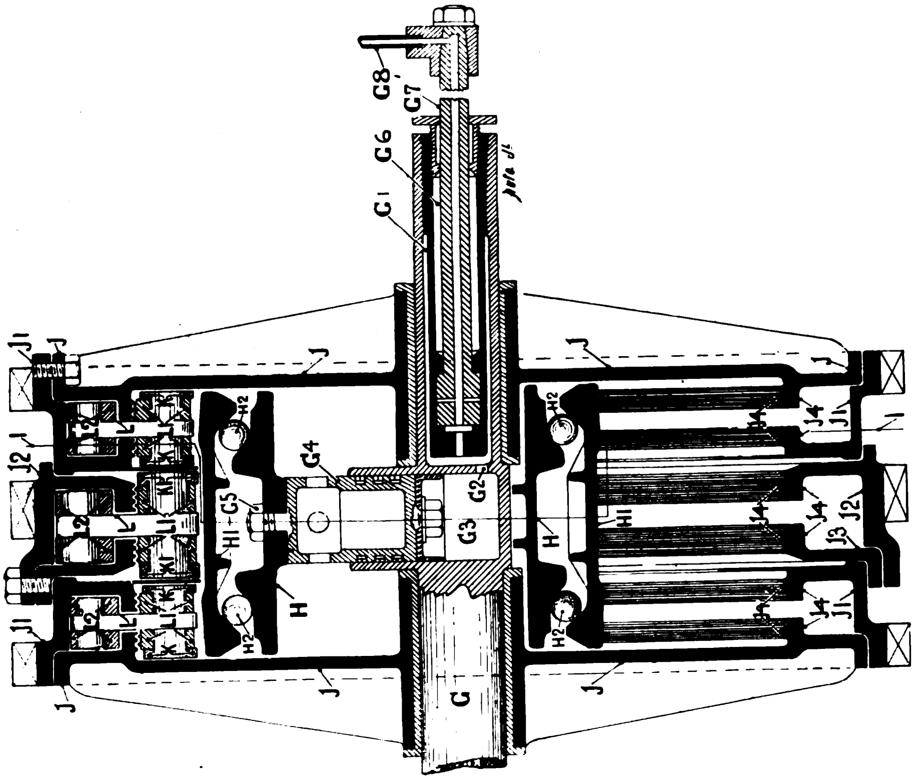


FIG. 22.—Longitudinal cross section.

clutch-rings, upon which they act. A continuous rotary motion is thus given to the clutch-rings, and they form that member of the gear from which the power is transmitted to the driving wheels of the car. The speed at which the car travels depends primarily upon the degree of eccentricity that is given to the eccentric.

Stated thus briefly the action of the Barber gear is easy enough to understand, and will be recognised by most of our regular readers as being somewhat similar to the Newman and some other gradually variable gears that have been described in our columns. The mechanism itself too is, as will be shown presently, of particularly simple construction, considering the functions which it performs. It is, however, less easy to obtain a thorough comprehension of the precise manner in which this gear works, for it has certain peculiar characteristics which are not at first self-evident, though it is essential that they should be recognised by those studying the mechanism. For this reason, we propose to briefly mention a few points of this kind before commencing the detailed description of its construction, and consideration of its operation, that we are about to give.

First and foremost, a difficulty is likely to arise, owing to the fact that an eccentric is usually employed to give a reciprocating motion in a radial direction from the shaft, and, therefore, that one is apt to forget that any particular point on an eccentric strap tends to describe a

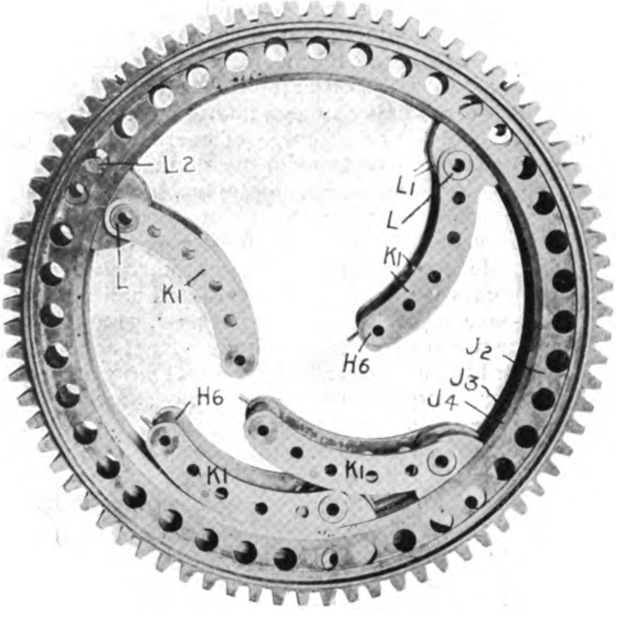


FIG. 24.—The Barber Gear. The central Clutch-Ring, complete with its clutches and operating links.

	The Driving Member.
G	Engine-driven shaft.
G^1	Hollow end of G.
G^2	Port leading from G^1 into cylinder, G^3.
G^3	Hydraulic cylinder formed in shaft, G.
G^4	Piston.
G^5	Stud fixed to piston, G^4.
G^6	Stuffing-box for hydraulic feed-pipe.
G^7	Stationary hydraulic feed-pipe.
G^8	Supply-pipe from hydraulic system.
	The Variable Eccentric.
H	Eccentric sheave.
H^1	Eccentric strap.
H^2	Ball-bearing races.
H^4	Projecting-lugs on strap, H^1.
H^5	One of the ball-bearing cones.
H^6	Hollow pins for connecting the links, K and K^1, to the strap, H^1.
	The Driven Members.
J	Side castings forming bearings for the clutch-rings.
J^1	Clutch-ring-castings forming outer gear-wheel.
J^2	Clutch-ring-casting forming central gear-wheel.
J^3	One of the inner clutch-ring-castings.
J^4	Projections forming the clutch-rings.
	Portions connecting the Eccentric with the Clutches.
K	Connecting links operating the "right-hand" clutches.
K^1	Connecting-links for "left-hand" clutches.
K^2	Clutch-springs.
	The Free Wheel Clutches.
L	Toggle-links.
L^1	Inner clutch-shoes.
L^2	Outer clutch-shoes.

Table of Reference Letters for the Barber Gear Illustrations.

circular path when the eccentric revolves, provided that there is no tendency for the strap itself to revolve about the eccentric. The mere fact that it is a circular path, over which a lug on the eccentric strap tends to travel, proves that it is possible to obtain a reciprocating motion direct from the eccentric in other than a radial plane, provided that the thrusts on the strap are balanced so far as rotation of the strap about the eccentric is concerned. Thus, in the Barber gear it is not the radial direction of travel of the lugs on the eccentric strap that is employed for transmitting the power to the free-wheel clutches, but it is rather the movement of these lugs

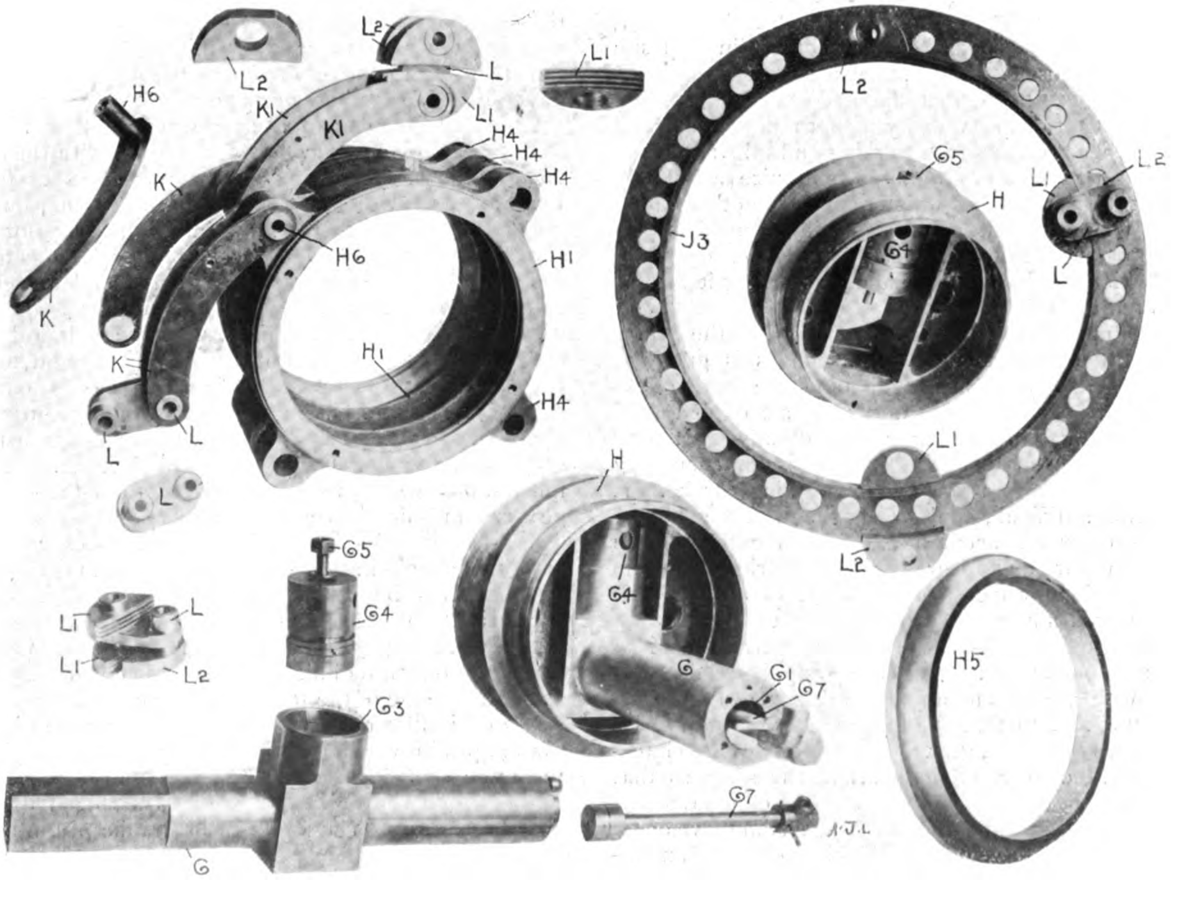


FIG. 25.—Various views of some of the chief portions of the Barber Gear.

backwards and forwards in a plane at right angles to the radial. As a matter of fact, as will be shown later, the useful reciprocating motion is not, strictly speaking, in a direction at right angles to the radial, but it is sufficiently tangential for the purpose of this preliminary explanation. It is important here to mention, too, that the free-wheel clutches are not moved at the same speed in both directions, as they would be if operated by a radially-arranged eccentric rod.

The next knotty point arises partly out of that which we have just considered, for it will be realised that if an attempt is made to obtain the reciprocating motion in a direction tangential to the eccentric, then it is necessary—in order to prevent the eccentric-strap from rotating idly about the eccentric—to place the strap in equilibrium, so far as its own rotation is concerned, by making it give equal tangential thrusts in two opposite directions at the same time. This is just what is done in the Barber gear, and it is this arrangement which is ingeniously taken advantage of in order to obtain the necessary differential action between the two driving road-wheels on the car. The eccentric strap has four equidistant lugs, and each of these lugs is connected by pivoted links and free-wheel clutches with *two* clutch-ring members that are driven by the eccentric in *opposite* directions. The thrust of the eccentric is thus imposed between the two clutch-rings, the one clutch-ring acting as the "abutment" for the other, and thus the eccentric ring, although free to "float" around the eccentric, does not normally do so.

As a matter of fact, however, there is a slight rotary motion of the eccentric strap around the eccentric, even when the two clutch-rings are compelled to revolve at precisely the same speed as one another (in opposite directions) because of the fact, to which passing reference has already been made, that the free-wheel clutches do not travel at the same velocity in both directions, and to the further fact that the working and idle strokes of the one set of clutches do not synchronize absolutely with those of the clutches which actuate the other clutch drum. This important point, also, will be made clearer with the assistance of diagrams presently, but the statements which we have just made concerning it will be found useful in the meantime.

As with other variable speed-gears in which the power is transmitted by a ratchet action, such as is given by free-wheel clutches of any kind, so in the Barber gear only one set of right-hand and one set of left-hand clutches is actually doing work at any particular moment, and even this set of each is only actually driving during a portion of its working stroke. It is, therefore, difficult, and we may almost say impossible, to calculate accurately the gear ratio of the mechanism for any degree of eccentricity of the eccentric. The velocity of the clutches during their operative strokes increases from zero up to a maximum, and then decreases till—at the end of the stroke—it is of course zero once more. The clutch-ring, however, must revolve with a constant angular velocity owing to its momentum, and to that of the vehicle, with the wheels of which it is in direct gear. The velocity of the clutch-rings must, therefore, theoretically be the same as that which would be imparted to them by the clutches at the moment when they have attained their maximum velocity. But since maximum velocity of the clutches is only maintained for an infinitely short space of time, it would follow that the whole of the power transmitted through the gear would have to be transmitted, from the clutches to the clutch-rings, by a succession of infinitely powerful blows. And no mechanical contrivance would stand this. In practice, however, the duration of time that is allowed for each clutch to do its work on the ring is extended considerably, and in the Barber gear it is the hydraulic system, by which the gear ratio is changed, that is further utilised as a cushion for this very purpose. The crushing strain, in any such gear as this—between the clutches and the clutch-rings—is, nevertheless, enormous, and that is why a good deal of trouble has, in the past, been experienced by other inventors in manufacturing clutches of the ball or roller type that will withstand the strain. Mr. Barber's clutches are of the toggle type—and unlike balls or rollers—have very large friction surfaces, so that the crushing strain is distributed over quite a large area.

With regard to gear ratio: when the eccentric is given any particular degree of eccentricity, the ratio, in the Barber gear, depends to a very great extent upon the load, for according as to whether the clutches are transmitting a greater or a less amount of power, so the hydraulic cushion "gives" to a greater or less extent, and when the hydraulic cushion comes into play the gear ratio is temporarily reduced during such time as the velocity of the clutches would otherwise exceed that of the rings. The clutches are then also caused to operate upon the rings for a greater length of time. This peculiar feature of the Barber gear is not only of very great importance because the shocks which would otherwise be imposed on vital portions of the mechanism are absorbed, but it goes a long way towards rendering the gear automatic, in the sense that the gear-ratio tends to reduce itself as the load increases. It is quite possible that in the near future Mr. Barber will be able to make an absolutely automatic gear of this kind for motor cars, thus relieving the driver of one of the duties which now has to be performed on every petrol car.

After these introductory remarks, we will now proceed to describe the construction of the gear, with the assistance of the accompanying illustrations—Figs 20 to 25. Fig. 20 is a view of the gear from the rear end, but the large external member that forms a bearing for the clutch-rings at this end has been removed so as to expose to view the eccentric and one complete set of clutches. Fig. 21 is a view of the eccentric complete with its strap; the shaft is in position inside it, although the hydraulic piston is not actually connected to the eccentric-sheave in this illustration. Fig. 22 is a longitudinal cross-section through the shaft, the eccentric, the clutches, and the clutch-rings. Fig. 23 is a transverse section on the line marked 1—1 in Fig. 22. These illustrations show the gear removed from the oil-tight gear-case in which it is mounted for use on a car. Fig. 24 shows the centrally-placed left-handed clutches, complete with the clutch-rings that they operate, and the connecting links by which they are actuated from the eccentric strap. In Fig. 25 are shown some of the chief portions of the gear, including the eccentric strap with a few of the operating links fitted to it, some of the clutch shoes, and some of the toggle links to carry them. Also seen in this illustration are the main shaft with its hydraulic piston withdrawn from the cylinder formed in it, the same shaft in place inside the eccentric-sheave, one of the clutch rings with clutch-shoes arranged upon it, and the eccentric-sheave with the hydraulic piston bolted to it.

Primarily the gear consists:—of the centrally arranged shaft, G, that is connected rigidly at its one end with the engine—either direct or through the main clutch; of the hydraulic cylinder, G^3, that is formed in the shaft forging; of the piston, G^4, which works in the cylinder, G^3; of the eccentric-sheave, H, which is fixed to the piston, G^4, and has guide surfaces inside it that fit against a squared portion of the shaft, G; of the eccentric strap, H^1, which is mounted on ball-bearings about the eccentric, and has twelve projecting lugs, H^4, arranged in four equidistant groups of three; of connecting links, K and K^1, that are pivotally attached at their one ends to the lugs, K^4, and at their other ends to toggle-links, L; of clutch shoes, L^1 and L^2, that are mounted pivotally on the toggle-links, L; and of three sets of clutch rings (with clutch surfaces, J^4), that are mounted in such a way that they can revolve freely about the shaft, G.

Considering each of these main elements separately, it will be noticed in the illustrations that the end of the shaft, G, furthest from the engine is hollow (at G^1), and that a hole, G^2, establishes communication between the inside of the shaft and the cylinder, G^3. That portion of the shaft inside which lies the cylinder, G^3, has a square cross-section, and is planed on either side to form flat guide surfaces. These surfaces fit corresponding faces inside the eccentric-sheave, H,—this sheave, H, encircling the shaft at this point. By this construction the sheave, H, is compelled to revolve with the shaft, but it is free to slide over it, and can thus lie either concentric with it or eccentric to it. The piston, G^4, which fits inside the cylinder, G^3, has a projecting bolt, G^5, at its outer end, by which it is securely bolted to the eccentric-sheave. Normally—as seen in Figs. 20 and 21—the sheave, H, is brought to a concentric position about the shaft, G, by four coiled tension-springs that lie around the cylinder, G^3, and it may also here be pointed out that the tendency of the gear itself, when the power is being transmitted through it, is also to bring the eccentric into this position. The duty of the hydraulic cylinder is to give an opposite effect, by forcing the eccentric-sheave, H, out of this position, the piston, G^4, then pushing the casting, H, so that it slides over the shaft, G, and causes it to assume a more or less eccentric position. The necessary means for doing this are provided hydraulically, oil, under pressure, being admitted to the cylinder, G^3, by a stationary pipe, G^7, which projects through a stuffing-box, G^6, into the hollow end of the shaft. The hydraulic apparatus used in conjunction with the gear will be considered separately later, so that for the moment we need only state that the driver has it in his power to admit a greater or less amount of oil to the cylinder, G^3, through the feed-pipe, G^7. A pressure of about 350 lbs. per square inch is at all times maintained on the oil, so that there is an ample force available for varying the eccentricity of the sheave, H, relatively to the shaft, G.

The eccentric-sheave, H, is fitted with hardened steel ball races, H^5, at each side of the periphery, and two rows of balls, H^2, run between it and the eccentric strap, H^1. It will be noticed that the sheave and the strap are of considerable width, and that the twelve projecting lugs, H^4, are all solid with the latter. The four lugs nearest the one end operate one set of right-handed clutches, and the four lugs nearest the other end operate another set of right-handed clutches, whilst the four central lugs operate a set of left-handed clutches. It should be added at this point that there are three independent sets of clutch-rings corresponding with the three sets of clutches, that the outer clutch-rings are geared together externally, and drive one of the road wheels on the car, and that the inner clutch-ring, which is caused to revolve in the other direction, is geared to the other car wheel in such a way that both wheels are driven in the same direction. The ball bearing between the eccentric-sheave, H, and the strap, H^1, not only permits relative rotation of these two parts without undue friction, but also has to take a considerable amount of thrust when the free wheel clutches are at work, and it is for this reason that ball bearings of so large a size are used. It may, perhaps, be convenient also at this point to mention that the reason why there are two sets of free wheel clutches instead of only one is that it is highly desirable to avoid all tilting—or side strains—and that the provision of one set on either side of the left-handed clutches secures a more perfect balance of forces throughout the entire mechanism.

The lugs, H^4, are fitted with hardened steel pins, H^6, which pass through them and carry the connecting links, K and K^1, in pairs at each of their ends. In our illustrations, the links passing from the outer lugs, H^4, are marked K, and these are assumed to operate what we are for convenience calling the "right-hand" clutches, whilst the other links, K^1, are those that pass from the central lugs, H^4, and operate the "left-hand" clutches. The links themselves are all similar, except that those marked K are led off in a forward direction from the eccentric strap, while the others (K^1), pass in the other direction to their clutches. These links are curved to such an extent that they do not foul either the eccentric strap, H^1, or the clutch rings, J^4, and at their outer ends they fit over the ends of the hollow pins which form a part of the toggle-levers, L, as seen. The links, K and K^1, are in compression when doing their useful working strokes, and are in tension only during the idle return strokes of the clutches. The toggle-levers, L, resemble thick flat plates with hollow pins projecting on both sides and near both ends—perhaps the best idea of their shape can be obtained from Fig. 25. The hollow pins fit into corresponding holes in the internal and external clutch-shoes, L^1 and L^2, respectively, and the pins carrying the internal shoes, L^1, are sufficiently long to also project through the ends of the connecting links, K and K^1. Spiral springs, K^2, are fitted between the clutch-shoes, L^2, and the connecting links, K and K^1, these springs tending to make the clutch-shoes grip the clutch-rings more readily, when required to do so, and also overcoming the tendency which exists for centrifugal force to lift the shoes clear of the clutch-rings, at high speed.

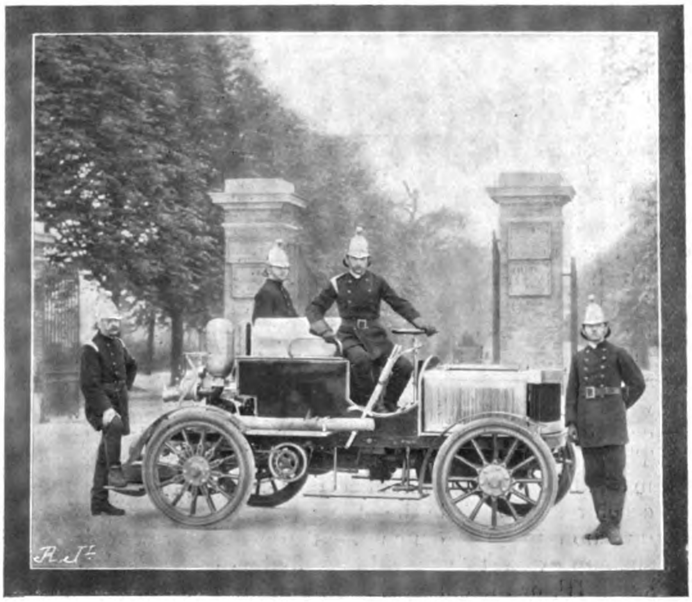
(*To be continued.*)

* * *

IN reply to numerous enquiries respecting the "H.F." vulcanising apparatus, which we described last week, we understand from Messrs. Harvey, Frost and Co., who are its manufacturers, that this device may be seen in operation at any time at 31, Basinghall Street by those interested.

MR. EDISON, it is reported, has brought out another invention. He is fitting out his electric cars with steam turbines coupled direct to the motor. The idea is that when the car runs short of electricity, instead of being dependent on an electric charging station, it can obtain steam from any suitable steam boiler to drive the turbine, which will work the motor as a generator and recharge the cells. Mr. Edison's grasp of situations appears to become more wonderful as time goes on.

A PETROL MOTOR FIRE ENGINE.



The Merryweather Petrol Motor Fire Engine. Side view.

To Messrs. Merryweather, whose energetic progressiveness we have frequently referred to, is the credit of having placed on English roads the first fire engine to be propelled and operated by a petrol motor. This is by no means the first self-propelled vehicle turned out by this well-known firm, for in our issue of June 7th, 1902, we chronicled the advent of their "Motor Fire King" engines, which were steam driven, and on July 4th, 1903, we described a combined fire escape and chemical fire engine, which was driven along the road by means of a petrol motor. The engine which we had the pleasure of seeing tested on Thursday of last week is, however, the first of its kind in which a petrol motor is used both for propelling the vehicle and for driving the pumps.

Our illustrations give a good general idea of the appearance of this fire engine, which is in every respect of most workmanlike construction.

In the front, under the bonnet, is a 30-h.p. four-cylinder vertical petrol engine which drives through a three-speed and reverse gear-box of the sliding spur-wheel type; the power being transmitted to the road wheels by side chains. The propelling mechanism is thus in every way similar to that of the majority of present-day automobiles.

For driving the three-throw Hatfield pump, which has a capacity of 300 gallons per minute, a separate spur-wheel is keyed to the second-motion-shaft, the shaft being prolonged behind the gear-box to receive it. A sliding gear-wheel on a separate longitudinal shaft, that passes rearwards to the pumps, can be caused to engage with the pinion at will, and, when engaged, the pumps are driven through a single reduction gear at the rear end of the shaft.

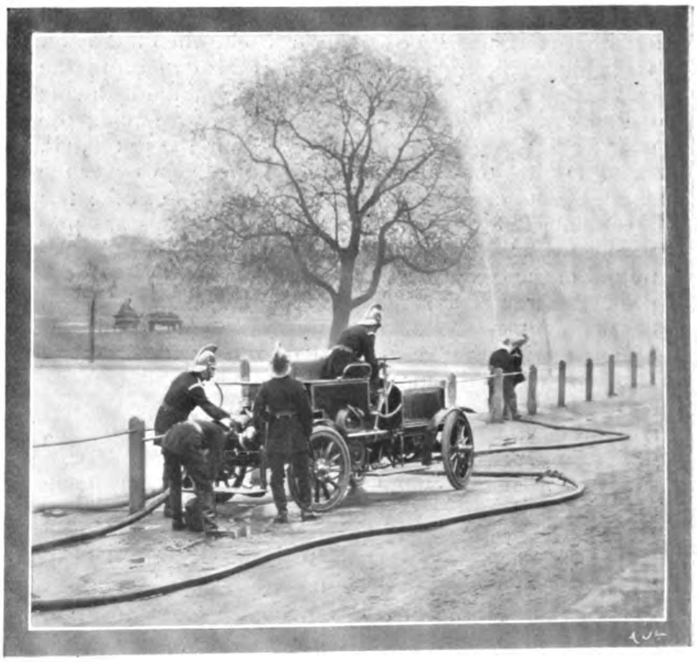
As will be understood, the three-speed-gear is still available for the pump, although for all ordinary purposes the top-speed only is employed.

A very simple jaw-clutch is employed for disengaging the sprocket wheels of the side chains before the pump is set running, the sprocket shafts being carried by brackets having very long bearings.

To transfer the engine power from the road wheels to the pump is only the work of a moment. A small lever on either side of the chassis releases the jaw-clutch of the side chains, and another lever throws the pump shaft pinion into gear; the pumps then immediately begin working.

The practical demonstration of this fire engine's capabilities was in every way satisfactory, very good speeds being obtained both on the level and up hills of varying gradient—up to 1 in 9 on Blackheath Hill.

It is to be regretted that England is not to have the honour of retaining this vehicle, but it has been built to the order of Lord Rothschild, and is, we understand, about to be dispatched to France. We can only hope that this country will not be long without fire engines of this type, which are apparently so eminently suited to the work they have to do.



The Merryweather Petrol Motor Fire Engine in full operation.

The railway strike in Budapest has been to some extent combatted by an automobile service, but the automobile cars are apparently unpopular with the strikers, for each automobile passenger van is accompanied by a soldier with fixed bayonet, who stands upon the vehicle.

That the benefits of motor car travelling are mainly due to the lengthened contact with fresh air is illustrated by the discovery of Dr. Blanche, of Lyons, who finds that regular motor car exercise, by which he means an average of 100 miles a day for lengthened periods, has been most effective in curing cases of consumption.

POPULAR MOTOR CARS.*—*concluded.*

By Mervyn O'Gorman.

7. **Pressure Supply** (Figs. 4 and 5).—The objects to be kept in mind were the qualities of a carburettor, and as no claim for credit can be made for resuscitating the surface carburettor, the sketch is given for what it may be worth.

The qualities of a petrol carburettor should be :—

I. To supply always the right quality of mixed gases to the engine, whatever the amount called for and whatever the rapidity of calling for that amount.

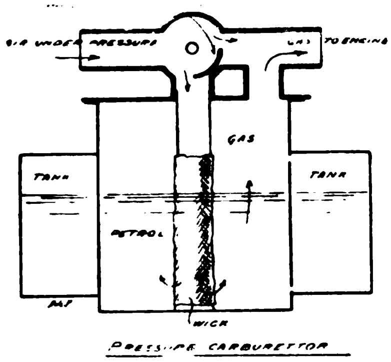


FIG. 4.

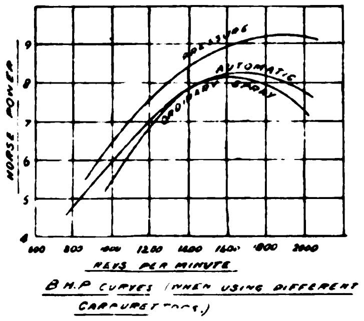


FIG. 5.

II To evince no will of its own in the selection of the mixture beyond keeping it constant when correctly adjusted.

III. To provide for perfect admixture of the constituents whatever be the proportions selected.

IV. To afford no constriction in the free passage of gases to the engine, *e.g.*, not to cause a diminution of the engine compression when running fast.

V. To allow for using up the whole of the commercial petrol as now sold, and not to be affected by occasional impurities.

VI. To provide an explosion mixture at once when all is cold on starting.

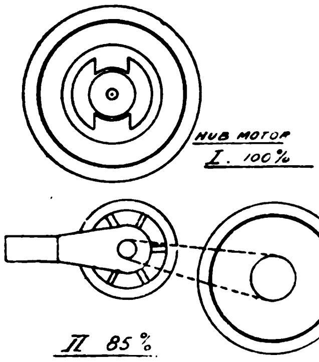
VII. To provide that the gases are unaffected in quality or in proportions, or in thoroughness of admixture, whether the demand be throttled or accelerated.

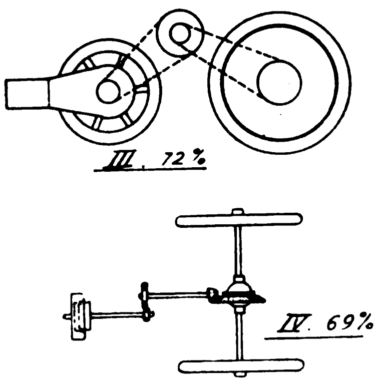
VIII. To be unaffected by the gradients climbed by the car, the jolting received by the car, or the manner in which it may be convenient to actuate the engine valves.

IX. To allow of easy regulation for best result in view of temperature variations either by hand or by using the difference of expansion of metals.

X. To be simple and contain—

a. No fine pipes or passages which can be clogged with fluff or dirt.





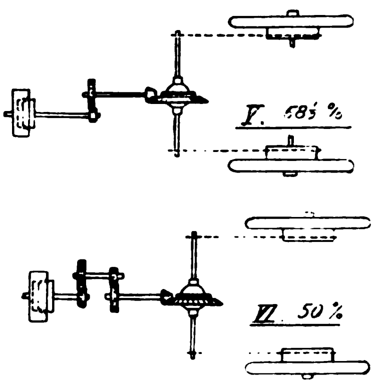


FIG. 6.—Direct-drive and Direct-drive once removed.

FIG. 7.—Direct-drive twice and three times removed.

FIG. 8.—Direct-drive four and five times removed.

b. Few, or preferably no moving parts or valves.

c. Nothing fragile.

d. Unable to leak or overflow.

e. To be extremely cheap.

XI. To be such that a poor quality of gas can be burnt in the engine, *e.g.*, by supplying such gas (at will) to the engine under a high pressure so that on the compression stroke it becomes combustible.

It is fairly clear that as petrol is a liquid and air is a gas, the laws of flow of each are widely different, and the weight of each which is drawn in does not depend merely upon keeping the degree of vacuum in the carburettor a constant, which is what a good "automatic leak" might do. More is required than this to comply with condition No. 1. On the other hand, if we deal with two gases under suction or pressure, it is chiefly a matter of proportioning the pipes to get these gases to follow the same law. On other points also the "pipe, tank, and wick" arrangement meets some points which are missed by the "spray automatic," viz.

It gives—

1. An approximately constant temperature of the air supplied to the carburettor.

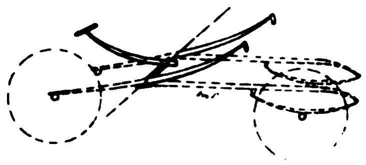


FIG. 9.—Springs for separately suspending the body work from one line of the chassis.

2. Control of this temperature without diminishing the amount of fuel taken in.

3. The more intimate mixing of air and vapour, an admitted quality of the old surface-carburettor, and proved in my experiment by the fact that the charge is more rapidly inflamed, and calls for less variation of the ignition lever.

4. Maintaining an uniform compression in the engine at all speeds, and allowing of its being increased so as to burn poor mixtures for economy, or for the sake of using alcohol, &c.

5. Scavenging out the exhaust residues at will when increased power is required.

I need not dwell on this any longer, but must mention that the well-known trouble with surface carburettors, that an alteration of mixture arises from the swilling of the liquid, is overcome by keeping the vapour in the tank at the point of saturation as nearly as possible.

So far as I have gone, only an exceptional road shock, such as is only met with once in many miles, affects the mixture, and I consider that the complete cure is within the range of the very simplest precautions.

8. **Direct Drive** (Figs. 6, 7, and 8).—A direct drive only occurs when there is no speed reduction between the motor and its work, and the degree of indirectness might be measured by the number of steps through which the power is transmitted, therefore we have:—

I. A direct drive with the "hub" electric motor, and nowhere else in the motor car industry (say 100 per cent. gear efficiency).

II. A direct drive "once removed," where the motor turns in the plane of the wheels, and its speed is reduced through the chain, the relation of speed being about 4·1 (say 85 per cent. gear efficiency).

III. A direct drive "twice removed," where the motor drives a gear-wheel which itself is geared to a chain sprocket, and thence to the road wheel (say 72 per cent. gear efficiency).

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* Paper read before the Society of Arts, April 20th.

IV. A direct drive "three times removed," where the speed reduction is the same as in III., but the power transmitted through a right angle (say 69 per cent. efficiency of gear).

V. A direct drive "four times removed," where speed reduction by chains takes place after the power has been transmitted to the train of gear mentioned in IV. (say 58½ per cent. efficiency).

VI. A direct drive "five times removed," when an additional pair of wheels is introduced, generally before the train of gears in V. (say 50 per cent. efficiency).

The direct drive of popular fiction is IV., III., or II., or a modification of IV., in which a higher reduction ratio is taken at one step in the bevel, or worm so as to omit the first pair of wheels.

The approximate percentages quoted show the enormous value of the direct drive, hence there is no criticism against the popular preference for a closer relationship between the engine and its work, but only against the nomenclature which endears with the title of brother an objectionable second cousin.

Variable Speed Gear.—It has often been said that since the explosion engine has been improved to run slowly, the large range of speed for each position of the speed lever removes all need for a continuously variable gear. This is wrong. If the argument were applied to a suggestion for increasing the number of steps from 3 to 5 or 7, it would be right, because the existence of steps introduces a human difficulty of estimating whether the engine will, under the conditions of the changed gear ratio, develop more or less horse power than it did before the change. If a man is driving for maximum speed—as sometimes happens—he can, when provided with a gear which is infinitely variable without unclutching, hunt about for the best position (just as one does with the spark lever), and luckily the best position is easy to determine from the very fact that it is a maximum, or a place where small errors on either side of the correct position are unimportant. But even this advantage is as nothing to the fact that such a "variable gear" can (without even the mechanical complication of a couple of flybobs) be made to automatically keep (for every gradient) the position of either of most efficient engine speed or of greatest engine output. I happen to know that one of our most ingenious experimenters is close upon producing this device, which will be of the utmost utility to cheap cars whose engines are on the verge of being too small for their work. With a view to this development, as also for more important reasons, I should like to see a revolution in motor car racing: racing with fuel efficiency as part of the competition; racing where moderate speeds and small efficient engines are necessitated by the limitation of the fuel allowance; racing where the winner may be going dead slow for fear that his quantity of petrol will run out before he reaches the winning post. Under these conditions I think that the same intense excitement and sport might be obtained, the same call made for skill from the driver, the same credit to be due to the designer for winning the race, but a more practical advance made on the occasion of each great race as obtained even now in the competition for the Gordon-Bennett Cup.

9. **Long Wheel Base.**—A long wheel base is not an object in itself, because most, if not all, its merits can be obtained by other means. Its advantages are:—

(*a*) The spring effect of the long girder (i), as a road-shock; (ii), as to engine vibration.

(*b*) Accommodation for a roomy tonneau or body with side entrance, without placing any part of the engine, &c., under the passengers.

c. Diminution of side-slip.

d. Steady running (to avoid "bouncing twice in one hole" as it is called).

The drawbacks are:—

I. Increased difficulty in rapidly turning.

II. It does not sufficiently cure side-slip to render non-slip devices undesirable.

III. It is more liable to distortion than a short frame with evil effect on the gear. IV. It adds to weight.

V. It adds to cost of purchase and stable accommodation.

We often forget that a good share of the advantages can be got without the drawbacks, and that a long wheel base is not the only means to the advantages.

a. The spring effect and a slow period of vibration (as compared to the frequency of road shocks) are obtainable by the easy means of coach springs, on condition they are prevented from bouncing either by a friction damper or an air damper. Resiliency is the bane of spiral springs, which are cheap but much too efficient, and until air springs have left the experimental stage coach springs are our best resort as affording plenty of friction between the leaves which thereby help to dissipate the energy of the blow. All springs waste energy and increase the resistance to travelling (as had, I think, been proved by experiments on ordinary vehicles, when it took more tractive force to move a ton on a well-sprung carriage than on an unsprung cart), but no enthusiast for a long wheel base suggests doing away with springs to save power, so it remains for the designer of a popular car to study the alternative methods of avoiding being personally bounced as a means of expending the energy stored in the springs.

I have made an attempt to secure this result by supporting the entire carriage work of a car from one line in the chassis (Fig. 9), so that the chief movement to be dealt with under these conditions is a movement of pivoting or rotation about that line, and it would appear that this rotation can be easily controlled or damped. I have not by this means obtained with a 6 ft. 9 in. wheel base and a half-ton car the comfort of a 9 ft. wheel base with the inertia of 20 cwt. on the springs, but the road shocks are unquestionably modified into a very pleasant undulating movement. Considering the great difference between the weight of a light car and that of a couple of passengers, and remembering at the same time the small expense of a separately sprung body, it is surprising that so little has been made of this arrangement, which gives, amongst other advantages, a means of concealing the irregularities of a single-cylinder engine.

If it is legitimate to promulgate a new catch word in a paper directed against them I would suggest "separately sprung body" for the consideration of the buying public.

b. The *accommodation* obtained by a long base can be got on a short one by an economy of bonnet, though as I am disposed to the belief that the really popular car should have its springs and running gear designed for the weight of two persons, only with an emergency space for a third, or for luggage behind, thus abandoning the tonneau with its need for a side entrance as inappropriate to a £200 car.

c. In this type of car which may often be tended by its owner, *easy access to the engine* is imperative, and as I have said this can be got without any waste of space.

d. The diminution of side-slip which is rightly claimed for the long girder construction loses all its importance when we remember that both long and short cars must in any event fall back upon anti-side-slip device, many of which effect a remarkable cure for this evil and combine it with protecting the tyres, adding to the efficiency of the brakes, and for speeds under 20 m.p.h., with which at present we are alone concerned, causing little appreciable loss of power.

Should we succeed in transferring these advantages to the short car, we can add to them the advantage which shortness itself ensures, that of easy handling and rapid turning, for in town we often require to turn within a circle of less radius than a car-length (just as a hansom does), whereas long cars cannot usually turn without backing in any road whose width is less than 50 feet.

Light Weight.—Apart from ease of control and simplicity of steering, gearing, and repair, the popular car can and should have one undeniable superiority over all other cars in its lightness, yet by an unfortunate oversight no claim is made on this score by the makers, no advertisements declare it, the assistants at the exhibits can hardly ever give a correct weight, and usually do not even trouble to invent one. Yet the number of hours to be spent on the roadside are chiefly determined by this, and the number of pence per car mile is dominated by this item.

Perhaps weight cutting is fraught with danger, unless the high-class makers take the lead, and (without looking forward to the time when the word featherweight will come to us from the bicycling world), I think that with skill the judicious cutting out of useless metal may be carried a very considerable way with advantage on cars whose top speed is strictly limited to 20 miles per hour.

Tabulating the advantages at the risk of repeating a very old story, I would say that by reason of its lightness a car required:—

I. Less fuel for any journey. II. Less power for any hill or for any speed. III. Cheaper tyres, and wears them less. IV. Less expensive parts. *But* V. Very careful design.

The problem of how to get lightness is peculiar. One would be tempted to suggest the great cure to be a high-speed engine, but practice proves that this is not the case, in fact, in small cars the brake-horse-power per cwt. of the car is independent of the speed of the engine—which shows that the additional weight of gear has outbalanced the economy of weight on the engine. In the very cheapest class of cars high-speed engines show some superiority, but in larger cars the slower speed of 800 revs. is about the usual practice.

Body Work.—With regard to body work, general design, and appearance, one would have supposed that the newness of the motor car would have given the most perfect freedom for ingenious design where each detail would be considered in the light of its utility alone. Yet, with the exception, perhaps, of the Lanchester, this is not the case. The popular car, which must face mud, dust, and rain, and be soused once a day with a hose, should have as sleek and simple an exterior surface as the deck of a yacht. But we do not find any provision for washing, and a cover to the underside of the machinery is looked on as a luxury limited to the élite of cars.

"INTERNAL COMBUSTION MOTORS."

By Dugald Clerk, M. Inst. C.E.*—(*Continued*).

Table III.—Air Standard Efficiencies with Heat added during Expansion.

$\frac{1}{r}$	E. Compression $PV^{1\cdot408}$ Expansion $PV^{1\cdot408}$	Compresssion $PV^{1\cdot408}$ Expansion $PV^{1\cdot2}$			
		E_1 Max. 1,600° C. Suction 0° C.	E_2 Max. 1,000° C. Suction 0° C.	E_3 Max. 1,600° C. Suction 100° C.	E_4 Max. 1,000° C. Suction 100° C.
$\frac{1}{4}$	0·43	0·385	0·380	0·378	0·367
$\frac{1}{5}$	0·47	0·424	0·417	0·415	0·401
$\frac{1}{7}$	0·55	0·476	0.468	0·462	0·440
$\frac{1}{10}$	0·61	0·521	0·507	0·591	0·467

Table III. shows the result of these calculations. The first column shows the efficiencies of standard engine, as in Table II. Column E_1 shows the efficiencies of adiabatic compression of air and expansion $PV^{1\cdot2}$, where the maximum temperature is 1,600° and the suction temperature 0° C. Column E_2 deals with the same case, maximum temperature 1,600°, suction temperature 100°. Column E_3 deals with maximum temperature 1,000°, and suction temperature 100°. Column E_4 deals with maximum temperature 1,000°, suction temperature 100°. The temperatures 1,600° and 1,000° are taken as the extremes used in gas-engines for effective work, and 100° is taken as the suction temperature which is ordinarily attained in most gas-engines. It will be observed that the efficiencies fall considerably from the standard efficiencies. The greatest fall takes place with the longest expansion. From these numbers it is evident that an air cycle operating so that heat is added as expansion proceeds, in addition to heat added at constant volume, is less efficient than an engine where all the heat is added at constant volume. In the extreme example, the efficiency becomes reduced to 0·76 of the standard efficiency; that is, it falls from 0·61 to 0·467; that is, the effect of adding heat on the expanding stroke in this particular case, by reducing the efficiency from 0·61 to 0·47, makes the high compression pressure due to one-tenth volume of compression no better theoretically than that due to one-fifth, when no heat additions during the stroke are made. The loss is less serious where the maximum temperature is 1,600°; and low suction temperatures favour closer approximation to the standard. The cause of the loss in efficiency becomes evident when the heat additions during expansion under these circumstances are compared with the heat additions made at constant volume.

Table IV. shows the proportion of heat added during expansion to total heat added at constant volume, heat added at constant volume being taken as unity.

Table IV.—Heat added during Expansion. Heat added Constant Volume 1.

$\frac{1}{r}$	Compression $PV^{1\cdot408}$ Expansion $PV^{1\cdot2}$			
	Max. 1,600° C. Suction 0° C.	Max. 1,600° C. Suction 100° C.	Max. 1,000° C. Suction 0° C.	Max. 1,000° C. Suction 100° C.
$\frac{1}{4}$	0·34	0·388	0·403	0·522
$\frac{1}{5}$	0·40	0·466	0·486	0·660
$\frac{1}{7}$	0·496	0·600	0·640	0·962
$\frac{1}{10}$	0·616	0·788	0·852	1·55

Taking $\frac{1}{r}$ as one-tenth, the heat added in the 1,600° to 0° C case is 0·616 of the heat added at constant volume, while in the 1,000° to 100° C. case it is 1·55 times that quantity. As these heat additions are made at lower and lower compressions, it is easy to see that, under these circumstances, lower efficiencies are obtainable. These figures clearly show the desirability of adding all the heat if possible at constant volume; that is, of avoiding all heat additions during expansion. If this cannot be done, then as little heat as possible should be added during expansion, and the maximum temperature should be kept up while the suction temperature should be kept down.

Taking another deviation to imitate what sometimes occurs in practice, the heat addition is assumed to be made so that one portion is added at constant minimum volume, another part is added at constant pressure during the first tenth of the stroke of the piston, then the expansion is continued $PV^{1\cdot2}$ to the end of the stroke. Compression is still $PV^{1\cdot408}$. In this case, with maximum temperature 1,600° C. and suction temperature 0° C., E_1 is 0·406; while with the same maximum, but suction temperature 100° C., E_2 is 0·358 for $\frac{1}{r}$ = one-tenth. Here there is a great falling off from 0·61 to 0·406 and 0·358 depending on suction temperature. These, however, are extreme deviations, which are avoided as much as possible by gas-engine designers. It is well-known to gas-engine constructors that to get the most economical diagram possible the ignition must be fairly sharp and the maximum temperature must come as nearly as possible to the compression end of the stroke. Igniting is always adjusted in actual engines to produce this condition. It is not very common to have expansion curves so flat as $PV^{1\cdot2}$, but expansion $PV^{1\cdot3}$ is very common. Taking here compression as $PV.^{1\cdot408}$ and $\frac{1}{r}$ equal to one-fifth, efficiencies are as follows:—

1,600° C. to 0° C. ... ... $E_5 = 0\cdot45$
1,600° C. to 100° C. ... ... $E_6 = 0\cdot446$

This case corresponds to a more common expansion curve, and here it will be seen that the number, 0·45 or 0·446, deviates but little from the standard efficiency, which is 0·47.

In all these cases the expansion is not considered as adiabatic. It has been assumed that the specific heat of air is constant. If, however, it be ultimately proved that the specific heat of air is not constant, the efficiency numbers obtained from similar calculations will not be greatly changed, because variable specific heat assumes a change in the internal energy of the working fluid, which is equivalent in its effects to heat added during an expansion stroke; that is, the heat which has to appear later in keeping up the expansion line above the ordinary adiabatic assumed for air must be stored up in the working fluid in the first instance, because of the increased specific heat at constant volume. Whichever proves to be true—constant specific heat with continued combustion, or varying specific heat with completed combustion, the effect upon efficiency will be very much of the same order as has been here calculated.

Notwithstanding the knowledge that our air cycle will deviate from a cycle of constant efficiency under the assumed conditions, yet the gas-engine cycle may be considered to be fundamentally one of this nature. In all modern engines of the explosion type the attempt is made to add all the heat as early in the stroke as possible, because heat added at the beginning is generally recognised as being more effective than heat added towards the end. This becomes evident on comparing the efficiencies obtained in actual engines with the standard efficiencies given at Table II. Table I. shows, in the column headed "E, standard air cycle," the efficiencies calculated in accordance with Table II.; that is, the efficiencies of the standard air cycle for the particular compression volume of each engine; the compression volume $\frac{1}{r}$ is given in the next column. In the column "$\frac{\text{I.HP.}}{\text{E}}$" the ratio of the actual efficiency to the standard efficiency is given, and there, it will be seen, that this varies from 0·48 in Slaby's experiment to 0·6 in Robinson's. The ratio is practically the same in the Humphrey test of the large "Otto" engine, and in the Robinson test of a "National" engine.

This comparison of efficiency of a standard air engine with that of the actual engine is even more interesting in cases where a series of experiments have been conducted with the same engine, varying compression only. Such experiments have been made by Professor Meyer in Germany and by Professor Burstall in England. Taking Professor Meyer's results, I have calculated out the air standard efficiency for the different compressions, which ranged from 40 lbs. per square inch to 80 lbs. per square inch above atmosphere.

In Table V. the results of this comparison are shown. The first column shows the actual efficiency; the second, the air standard efficiency; and the third, the actual upon standard. The fourth column shows the revolutions per minute of the engine.

In this case, although the air standard efficiency varied from 0·33 to 0·44, the ratio of the actual efficiency to the standard was practically constant at 0·58. In the case where the number becomes

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* The "James Forrest" Lecture, 1904, read before the Institution of Civil Engineers, on April 21st.

0·57, this is evidently due to the lower rate of the revolution of the engine in that test.

Table V.—Calculated from Professor Meyer's Experiments.

Actual Efficiency.	Air Standard Efficiency.	Actual Standard.	Revolutions per Minute.	Dimensions of Engine, &c.
0·250	0·44	0·58	257	Engine 7·8 inches diameter by 11·8 inches stroke. Compression varies from 40 lbs. to 80 lbs. above atmosphere.
0·244	0·42	0·58	249	
0·214	0·37	0·58	251	
0·188	0·33	0·57	225	

The first and second parts of Table VI. show the actual and air-standard efficiencies calculated by me from Professor Burstall's tests (Gas Engine Research, Institution of Mechanical Engineers) for the highest and lowest results.

Table VI.—Calculated from Professor Burstall's Tests.

—	Actual Efficiency.	Air Standard Efficiency.	Actual Air Standard.	Maximum Temperature.	Dimensions of Engine, &c.
		First.			6 inches diameter by 12 inches stroke. Revolutions about 200. Compression from 30 to 105 lbs.
A^7	0·189	0·33	0·57	1145°C.	
B^9	0·212	0·36	0·59	1098°C.	
C^7	0·219	0·43	0·51	1154°C.	
D^8	0·231	0·47	0·50	1094°C.	
		Second.			
A^1	0·166	0·33	0·50	1751°C.	
B^2	0·187	0·36	0·52	1745°C.	
C^1	0·172	0·43	0·40	1749°C.	
D^1	0·181	0·47	0·38	1437°C.	

The first and last columns have been taken from Prof. Burstall's tables; the second and third columns have been calculated from the details given by him.

It will be observed that all the higher efficiencies were obtained with maximum temperatures of about 1,100° C. and all the lower efficiencies with temperatures of about 1,700° C. It will be further observed that in the first two tests, A^7 and B^9, the ratio is 0·57 and 0·59. In the second two, C^7 and D^8, it falls to 0·51 and 0·5. In A^1 and B^2 also this ratio is less, 0·5 and 0·52, but in C^1 and D^1 it falls to 0·4 and 0·38.

It is interesting to compare these results with the numbers found in Prof. Meyer's experiments, where the actual efficiency divided by the standard efficiency gives practically a constant 0·58, whereas in Prof. Burstall's experiments the ratio varies from 0·38 as a minimum to 0·59 as a maximum. In both sets of Prof. Burstall's experiments, at a certain stage of compression, to raise compression to C^7 and D^8 a projecting block was attached to the piston beyond the junk ring. This produced an annulus between the combustion space walls and the projecting block, so the heat of the explosion was rapidly lost, more rapidly with high temperature than with the low temperatures; so that, instead of efficiency increasing with increased compression, in the high temperature cases the efficiency actually fell, so as to be less at high compressions than at low compressions; that is, instead of a continued increase of efficiency with increased compression, at a certain point the efficiency fell instead of rising.

These experiments very clearly show the prejudicial effect of high temperatures in increasing heat losses, and also the evil effect of cooling surfaces of certain configurations.

From these numbers it may be taken that in motors of ordinary commmercial constructions of to-day the actual efficiencies vary from 0·5 to 0·6 of the air standard efficiencies, depending on the dimensions of the engine and the success of the designer in arranging the shape of the combustion space, and also, of course, upon the perfection of the action of the valves. The deviation of the actual from the air standard efficiencies are, of course, due to heat losses to cylinder and piston, heat additions at improper periods, varying specific heats due to the fact that the working fluid of the gas-engine is not pure air, and possibly to change of specific heat with changing temperature.

(*To be continued.*)

CORRESPONDENCE.

◆

LONDON TRAFFIC.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—Will you permit me to call attention to an error in your otherwise admirable description of Mr. C. S. Meik's and my own proposals for the Improvement of London Traffic. Referring to the following sentence:—

> "A variation of the design consists in arranging the motor car road down below in a space set apart for stores, but the suggestion to banish automobiles in this way from the light of day fails to appeal to us."

We do not propose to banish motor cars from the light of day, our suggestion being that the motor road should normally be located at the level of the lower deck, rising to the level of the upper deck where necessary to allow cross roads to pass underneath. The effect of this would be that the road would always be completely open to the sky, but when at the lower level would be bounded by high walls, which would have much the same effect as the houses in a narrow street. The motor road cannot be continuously kept at the level of the upper deck, because it is necessary to allow cross-communication and this would therefore interfere with the motors, if the special road for these vehicles were not carried at the lower level proposed.

It was one of our chief endeavours to provide special roads for motors, through the most crowded parts of London, which would be entirely free from interruption from other traffic, and as this is the feature of our scheme which will no doubt have more interest for your readers than otherwise, perhaps you would kindly publish this letter.

I am, Sir, yours faithfully,

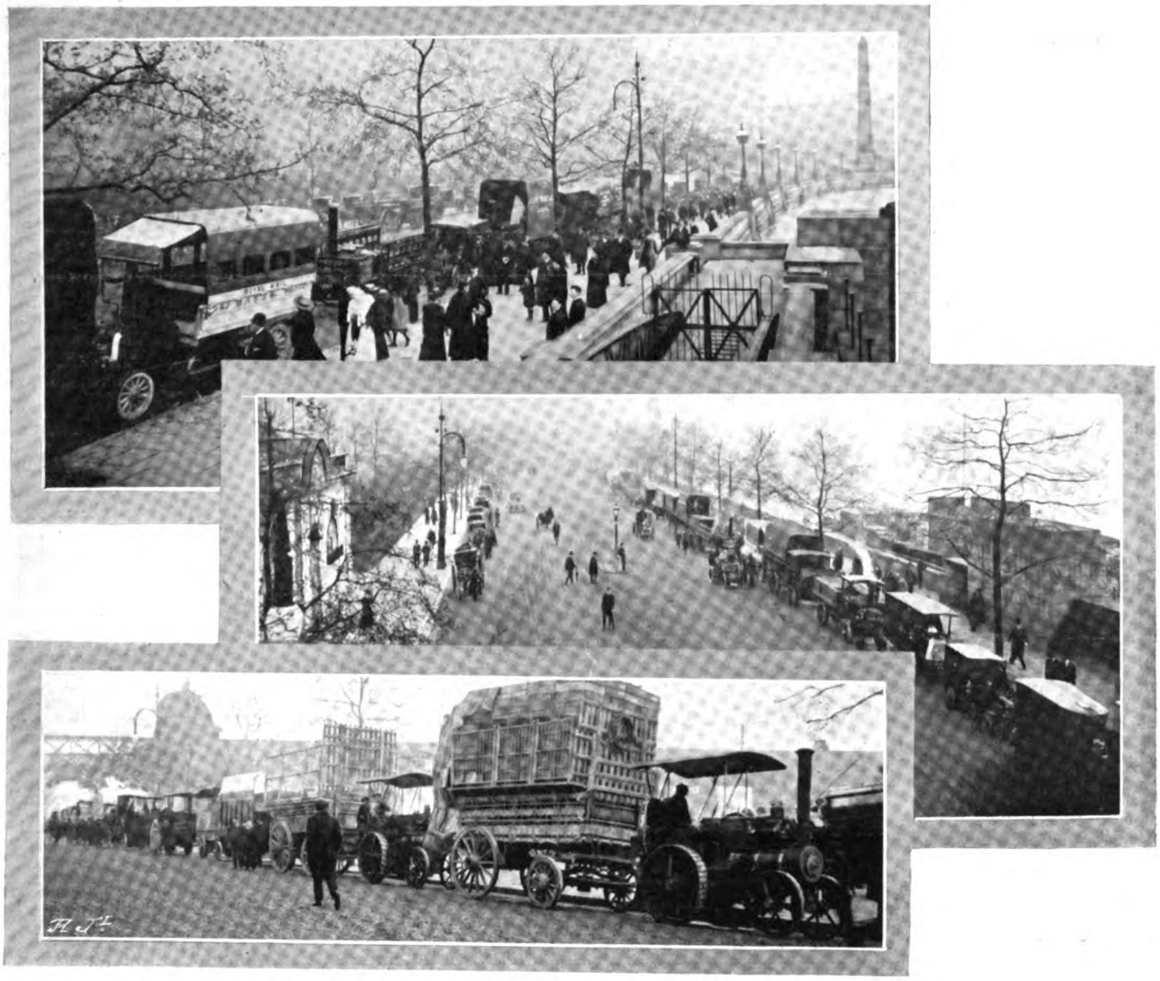
47, Victoria Street, S.W., WALTER BEER.
May 2nd, 1904.

THE motor omnibuses which are being run in Birmingham, by the Birmingham Motor Express Company, have so far proved eminently successful. The Express Company, commencing with July, propose running a 15-minute service between Harborne and the city, besides putting additional cars on the Hagley Road the second week of this month. The Birmingham Watch Committee have granted the full licenses for the extra services of the company, which promise to be of considerable importance in facilitating traffic in the town, and it is hoped that with the inauguration of the 15-minute service the much-vexed tramway question in the district will be a step nearer solution.

WE would recommend the formation of a fund for supplying the journalists on the daily papers with motor cars gratis. It would really be worth while, for until they own motor cars themselves it is quite obvious that they are determined never to do justice to the automobile in the columns in which they are permitted by circumstances to air their views. About 28 miles from Paris, on the Melun road, there is a level-crossing. Over this crossing was passing on Monday last a motor car containing six people. That it was crossing the line at the time is evidence that the gates, or rather the swing-bars which represent our crossing gates on the Continent, were not in position. In other words, one of the railway officials, who has since been arrested, had blundered badly. For the Bale Express was due, and the unsuspecting motorists were dashed into by the train, and five of them killed on the spot. It was a horrible accident, and might equally well have happened to a horse-drawn vehicle, a bicycle, or a traction engine. Will it be believed that nearly every morning London paper has headed its description of this tragedy by the words "Motor Disaster"? It is nothing short of a public scandal.

MAY-DAY MOTOR PARADE.

A modest attempt last year was made by the Thornycroft Steam Wagon Company, Limited, to gather together on the Thames Embankment on May-Day as many of their well-known motor lurries and vans in active work as possible, with the idea of awarding prizes to the drivers of those vehicles who took sufficient pride in their charge to keep the machinery clean and in perfect running condition and to look well after the outward appearance of their machines. Both from the manufacturers' and from the users' point of view this proved a powerful incentive to the drivers, and the success which attended the parade was so pronounced that the Automobile Club, when approached upon the subject, at once took up the organisation of a similar parade for the present year, with the difference, however, that the display was not confined to any particular make of heavy vehicle. The result on Saturday last was a revelation to a very vast number of the public who gathered to see the novel show. 82 vehicles, in many instances with trailers attached, formed a very imposing line, commencing a little to the west of the Charing Cross Railway Bridge, and extending in single file beyond Waterloo Bridge. The vehicles included 69 steamers, 12 petrol-driven vans, and one petrol-electric. In respect to numbers the Thornycroft Company were easily first, with no less than 26, the Straker Steam Wagon Company, Limited, coming next with 12, the Lancashire Steam Motor Company and the Yorkshire Steam Wagon Company tieing with six each, whilst most of the other leading makers were represented by a fair showing of their particular type, including several specimens by Fodens, Coulthards, Wallis and Steevens, Gillett Motor Company, Milnes-Daimler, &c. At the head of the line were appropriately "Perseverance 1903" and "Progress 1903," two of the "little giants" attached to their Covent Garden market carts, of which such a large number are now to be seen about during the hours of the night and early morning, when most of London is asleep. In the early days only a few brewing firms and contractors for heavy goods attempted to make use of mechanical vehicles for their work, but, judging from the gathering of Saturday alone, the manner in which almost every class of commercial business is now employing motor vehicles for everyday work is an object-lesson which is likely to lead to the further extension of the system. The scope for their use is absolutely



MAY-DAY HEAVY WAGON PARADE.

1.—The Competitors as seen from Charing Cross, looking towards the Cecil and Savoy Hotels.
2.—The View from Hungerford Bridge.
3.—The Head of the Procession.

unlimited, and amongst the users whose names we casually noted as prominent in the line were such firms as Bird's Custard Powder, Johnson's Iron and Steel Company, Limited, Fremlin's Brewery, Allen and Hanbury, Dewar's, Pickford's, Carter Paterson and Co., French Asphalte Company, Mann, Crossman, and Paulin, Hampton's, J. and M. Patrick, Acme Flooring Company, Schweppe's, Bryant and May's, Searcy, Tansley and Co., Ilford, Limited, Midland Railway Company, J. Mowlem and Co., Waring's, Limited, Watney, Combe, Reid and Co., Stansfield and Co., Joseph Mears, City of Westminster, City of London, Piggott Bros., Wild and Robbins, G. Farmiloe and Co., Toler Bros., Hamilton and Co., Middlesex Hospital, Greenfield's Brewery, Dorman, Long and Co., British Vacuum Cleaner Company, Liberty and Co., Sanderson and Sons, Thorn Bros., and last but not least His Majesty's General Post Office. For some reason the Chelsea Vestry were not represented by their four Lancashire and Thornycroft wagons.

The fact that the Midland Railway Company, after considerable experience with several Milnes-Daimler vans, have determined to extend their operations in this direction very considerably, should lead a number of other Corporations to "come down off the fence" and take advantage of the enormous facilities and advantages which mechanical vehicles offer to those who are able to systematise their use.

The Post Office were represented by a Durkopp parcel van, which has been employed in the Redhill service, starting February last, under a contract with the Provincial Carriers, Limited. This car, which we understand has run its journey regularly without any hitch, we noticed was fitted with Sirdar Double Buffer tyres, of which the driver spoke in the highest terms. In several other directions the Provincial Carriers Company appear to be pushing along, the Company not confining its work to any particular type of vehicle, but availing itself of different systems to suit the particular contracts which they from time to time undertake. An object of considerable curiosity was the steam tractor (Carmont's), which is in active service in connection with the Post Office under arrangement with the Lomax Motor Horse Company, who are running this machine in the Guildford Parcels Post service regularly.

In striking contrast to the larger vehicles, several of the comparatively small fry were conspicuous. In this respect the palm was taken by the Clarkson steam vehicles, the White steam cars which Messrs. Liberty and Co. are making a feature of in their business, and the Gillett steam van employed by Waring's. A smart little red-painted Gladiator parcel van sent by Messrs. S. F. Edge, Limited, was included in the procession, and the Caravan Restaurant was a centre of attraction during the whole of the afternoon. A somewhat ancient and dilapidated looking conveyance bearing the legend "Royal Mail," at first glance at the superstructure, brought back memories of some of the old world out-of-the-way carrier vans which are occasionally met with throughout the country, but upon closer inspection this was found to be a real business conveyance on a Milnes-Daimler chassis, which is being employed by the General Post Office for their parcels work between Mount Pleasant and Epping. This has already been in work for the past eight months under a contract with Mr. Hayes, of Plumstead, and we gathered from a representative of the London Postal Service that its performance has been of an extremely satisfactory nature during the whole of the period. In fact, so much so, that the contractors have just renewed their contract with the Post Office for a further three years and are now arranging to extend the work for London service. The average load carried by this vehicle is 16 cwt., which is very considerably under its capacity, at Christmas quite double this quantity being conveyed. Every night the vehicle leaves Mount Pleasant at 11.50 p.m. and is timed to arrive at Epping at 2.8 a.m., where a stop of 10 minutes is made, and the return journey is completed to Mount Pleasant at 4.20 a.m., a distance out and back of 36 miles. *En route*, the van serves the following post offices:—South Woodford, Woodford Green, Buckhurst Hill, Loughton and Chingford.

Judging by the general appreciation of the Parade this year, it is practically certain that when in 1905 the scheme is more widely known, a splendid assemblage of motor vehicles should be got together and the parade made one even more worthy and representative than this year's, of the automobile industry. The following vehicles were found by the judges to be in first class condition, and so were awarded a first prize:—

Description.	Owners.
Wallis Tractor and Trailer	Wild and Robbins.
Foden Tractor and Trailer	Chislehurst Mineral Water Co.
Milnes-Daimler Delivery Van	Bird's Custard Powder.
Thornycroft Steam Wagon	Allen and Hanbury.
Yorkshire Steam Wagon	Allen and Hanbury.
Thornycroft Steam Wagon	J. Dewar and Sons.
Straker Steam Wagon	Carter Paterson and Co.
Lancashire Steam Motor	Mann, Crossman and Paulin.
Fischer Petrol-Electric Van	Hampton and Sons.
Milnes-Daimler Bus	G. Hayes.
Thornycroft Steam Wagon	Schweppes, Ltd.
Thornycroft Steam Wagon	Searcy, Tansley, and Co.
Lancashire Steam Motor	Bryant and May.
Straker Steam Wagon	Provincial Carriers.
Thornycroft Steam Dust Cart	City of Westminster.
Thornycroft Steam Water Cart	City of Westminster.
Thornycroft Steam Water Cart	City of Westminster.
Straker Steam Wagon	Piggott Brothers and Co.
Thornycroft Dust Cart	City of London.
Thornycroft Dust Cart	City of London.
Clarkson, Ltd.	Hamilton and Co.
Lancashire Steam Motor	H. Greenfield and Co.
Straker Steam Wagon	Dorman, Long, and Co.
Thornycroft Restaurant Van	Caravan Restaurant Co., Ltd.
Thornycroft Steam Wagon	British Vacuum Cleaner Co.
White Steam Van	Liberty and Co.
Thornycroft Steam Wagon	Sanderson and Sons.
Straker Steam Wagon	T. and W. Farmiloe, Ltd.

The three City of Westminster vehicles were considered by the Judges to be of a very high order of merit, and would certainly have had the team prize if one had been awarded. The vehicles belonging to Messrs. Hamilton, and Wild and Robbins, were also considered worthy of special notice by the Judges.

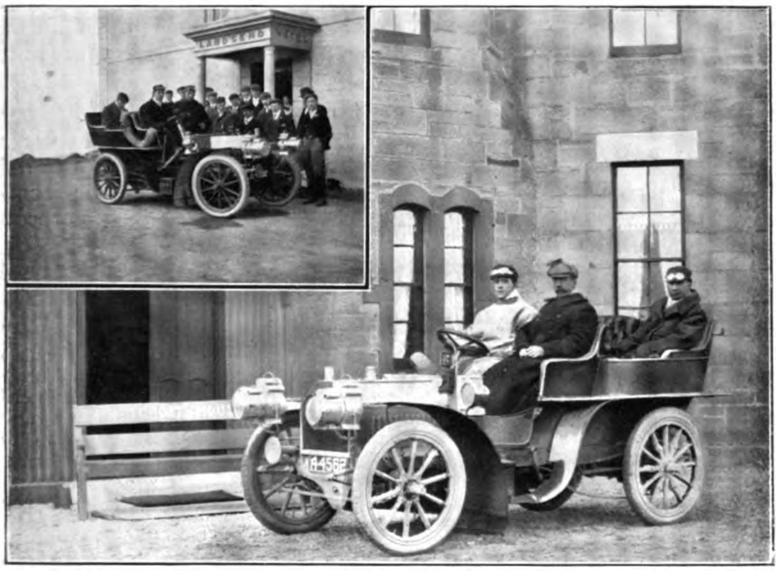
THE City of London has given formal notice that it intends to apply to the Local Government Board to have the 10 mile limit of speed decreed within the confines of the City.

To stand in the road with a pencil and note book and write down the numbers of passing motor cars is becoming a regular amusement with village children. It is doubtless harmless enough as regards the legal consequences, but it is becoming almost as dangerous as the idiotic game of "last across," on which we commented last week, for in their enthusiasm and desire to obtain the numbers of the passing cars the children very often get dangerously near them and become a serious annoyance to the drivers who have to dodge them.

RACES, RECORDS, AND TRIALS.

THE 2,000 MILES RUN.

Last week we gave particulars of the long distance run which had been undertaken by Mr. Cecil Edge, on a 15-h.p. Napier car, up to the time when the Grampian Hills were recrossed on the southward journey. Unfortunately the time of arrival in London was considerably delayed beyond the hour anticipated owing to very bad tyre troubles, and ultimately Piccadilly was reached at 4.15 p.m. on Friday the 29th ult. During the run the engine was not stopped from the time of starting in London until the car had covered 1,107¾ miles, when the near-side chain snapped at Golspie, just outside the gates of Dunrobin Castle, the Duke of Sutherland's glorious Highland home. The mud in which the car was smothered was further responsible for spoiling the "engine-non-stop run" at this point. After a delay of half an hour matters were again set right, and the journey continued. The total time taken from first to last was 136½ hours, (net 106½) and the distance 2,068½ miles. The first serious mishap of the journey occurred far up the pass that leads to Dalwhinnie and Inverness, where the track is very narrow and tortuous, and which upon this occasion was covered with snow and not, therefore, easily followed.



THE 2,000 MILES RUN.—Mr. Cecil Edge and his companions on the 16-h.p. Napier Car at Land's End (the smaller picture) and at John o' Groats.

In attempting to negotiate the approach to a mountain stream spanned by a low bridge, a mistake was made, and the car plunged a couple of feet over the bank into the swirling water. Two of its occupants were compelled to wade knee-deep in the bed of the stream, and by dint of much exertion on the spokes of the driving-wheels, the reverse was effectively employed, and the Napier returned to *terra firma.*

John o'Groats was reached at 11.45 a.m. on Tuesday, April 26th, and the car started on its southward journey at 12.20 p.m. The following is a short digest of the journey from this point, given by one of the occupants who accompanied the car throughout the entire run:—

"Owing to the heavy nature of the roads, and the fact that many wrong turnings were taken, progress to Perth was extremely slow. Leaving Inverness (1,299¾ miles), an unnecessary *detour* of more than 50 miles through Nairn and Forres occasioned some heartburnings, which were only partially allayed by the splendid performance through Stirlingshire and Lanarkshire over magnificent roads and under a cloudless spring sky. It was after leaving Carlisle (7.45 p.m. on the 27th) that the most serious delay of the trip was encountered. On Shap Fell, midway between Penrith and Kendal, the last available tyre cover burst, and one of the party set out on a four-mile walk to the nearest railway station, where, after some persuasion, the station-master, who had been brought out of bed at two o'clock in the morning, was induced to send a service message to London. New covers were despatched by the first train in the morning, and reached the anxious automobilists, who continued their journey at 4.45 p.m. on the 28th after an enforced delay of 18 hours in the wilds of Westmoreland, reaching London without further serious mishap."

THE 2,000 MILES RUN.—Return of the Napier Car to London after the run. Stopping the engine at the finish. In the smaller photograph Mr. C. J. Glidden, who is doing a tour of the world on his 24-h.p. Napier Car, is seen congratulating Mr. Cecil Edge on his home-coming.

Boston Commonwealth Avenue Hill Climb.—Last week we gave the times for the best performances in this event, the distance being one-fifth of a mile. The following are the results in each class:—

Class AA. Cars weighing over 2,204·62 lbs.—A. Adams' 24-h.p. Pope-Toledo, $29\frac{2}{5}$ secs.

Class A. Cars, 1,433 to 2,204·62 lbs.—H. L. Bowden's 60-h.p. Mercedes, $15\frac{2}{5}$ secs.

Class B. Cars, 881·84 to 1·433 lbs.—H. P. Hills' 40-h.p. G. Richard, $15\frac{2}{5}$ secs.

Class C. Cars, 551·15 to 881·84 lbs.—J. C. Robbins' 6-h.p. Orient, $33\frac{2}{5}$ secs.

Steam Cars.

Class A. C. B. Grout's 12-h.p. Grout, $21\frac{3}{5}$ secs.
Class B. L. S. Ross' 6-h.p. Stanley, $18\frac{2}{5}$ secs.
Class C. F. H. Marriott's $4\frac{1}{2}$-h.p. Stanley, $16\frac{3}{5}$ secs.

Glasgow-London Run.—A Vulcan car has been entered, under the increased entrance fee rule, by the Scottish Motor Garage Company, Ltd., 96, Renfrew Street, Glasgow, to take part in this run on May 19-20th. It is a 2-cylinder car built by the Vulcan Motor Company at Southport.

Prince Albert of Belgium last Saturday formally inaugurated the fourth Antwerp Cycle and Automobile Exhibition.

M. Périssé has been nominated by the A.C. of France to watch the "Slipping" Tests in connection with the Anti-Skid Trials now being held by the A.C.G.B.I.

The Prefect of Dordogne has intimated that he does not propose to authorise the Perigruex Hill Climb this year, which it was arranged to hold on May 15th under the auspices of the A.C. of Dordogne.

Baron de Caters, on his 90-h.p. Mercedes car at Ostende, attempted on Sunday to lower Rigolly's world's record of $23\frac{3}{5}$ secs. for the kilom. He came one second short of this, but has thereby secured the Belgian record for the kilom.

CLUB DOINGS.

Derby and District Automobile Club.—In response to the invitation of Mr. Charles Crompton, one of the vice-presidents of the club, a most interesting visit was paid to Mr. Crompton's iron works at Stanton last week, when about 30 cars joined in the outing. Fully 60 visitors were conducted over these splendid works, where every detail of the process of making and drying the moulds, the cores and finally the casting of the various sizes of iron pipes, for which the firm are so well-known, was witnessed. One of the most interesting features was the making of the tubes for the various tube railways now being constructed in London. A bird's-eye view from the top of one of the furnaces gave a very remarkable impression of the extent of the works. Subsequently the visitors returned to the hall at Stanton, where a very hospitable welcome was given them by Mrs. Crompton. Before leaving, the grounds of the hall were inspected and the company marshalled by the hon. secretary, Mr. Charles J. Allin, in front of the conservatory, where the photograph of the party, shown on this page, was taken. Amongst those who took part in this run, which was voted one of the most interesting and enjoyable outings since the formation of the club, were Messrs. Ottewell, F. Smith, Guest, Tissington, Hewitt, Sayer, Leech, Clarke, Simkiss, Fletcher, Allin, and Drs. Copestake, Arundel and Pounds, of Derby; Mr. Reading, Burton; Dr. Walford, Alfreton; Mr. Topham, Morley; Mr. Bolton, Oakamoor; Mr. Schwing Broomfield; Mr. Astle, Draycott; and Mr. O. J. Bamford, Uttoxeter. The next fixture of the club is a hill-climbing competition on May 14th.

DERBY AND DISTRICT AUTOMOBILE CLUB RUN TO STANTON.—Members and their friends gathered at the Hall, where hospitality was dispensed by Mr. and Mrs. Charles Crompton, the hosts of the day.

Hertfordshire Automobile Club.—H.S.H. Prince Louis of Battenberg, who is a resident in the county and drives a Wolseley car, has consented to become one of the vice-presidents of this club. About 25 members and friends participated in the club run to Toddington, in Bedfordshire, last Saturday, several who had promised to take part being kept away by the very unsettled weather. The Sow and Pigs Hostelry at Toddington was the rendezvous, and after a delightful tea and merry chat, the members strolled round the pretty gardens of the inn. Toddington is an old-world place, with village green, and church filled with frescoes. It is out of the ordinary path of motors, and the villagers took the greatest interest in the event. A full programme of fixtures for the summer is being prepared by the committee.

Leicestershire Automobile Club.—Perfect climatic conditions favoured the run of this club on Saturday last, when an outing of about 32 miles to Daventry, Northamptonshire, was participated in by ten cars and two motor bicycles. The route was *via* Blaby, Lutterworth, and Rugby, which passes through some of the most delightful scenery within reach of Leicester, made all the more beautiful just now by the early and exquisite tints of spring. The president of the club, Mr. G. E. Mawbey, had a pleasant surprise in store for the members upon their arrival at the Wheatsheaf Hotel, as it was thought that he had been unable to join in the run, whereas he had, finding himself late, travelled direct through from Syston, and had managed to not only make up for lost time, but reach the meeting spot first. Over 40 participated in an excellent meal, provided by mine host of the day, Mr. E. W. Killick, these including Mr., Mrs., and Miss Mawbey, Mr. Maurice Mawbey, Mr. T. C. and Miss King, Mr. and Mrs. Hargreaves, Mrs. Orson Wright, Mr. O. Wright, jun., Mr. and Miss Perkins, Mr. Perkins, jun., Mr. Herbert, Mrs. S. F. Herbert, Mr. A. H. Faulkner, Mr. Clarkson, Mr. Barron, Mr. and Mrs. W. Clements, Mr. T. S. Pettifor, Mr. and Mrs. Whitby, Mr. G. H. Wait, Mr. Woodward, Mr. Bentley, Mr. Tyler, Mr. J. McAlpin, Mr. C. Langmore, Mr. Thompson, Mr. Doran, Mr. Binns, Mr. Mouls, and Mr. Allan McAlpin (hon. secretary). The return journey, starting at six o'clock, was made by the old Watling Street in equally delightful weather as at the start, Leicester being reached in good time by the whole of the members.

Lincolnshire Automobile Club.—A delightful run in connection with this club was held last Saturday (April 30th), when the members mustered in strong force at Brigg, a charming place with lovely scenery around it, on the edge of the wolds. It is a convenient centre for motorists, and those who attended the fixture were principally members residing in the northern part of the county. This was the third outing of the season, and fine weather again favoured the run. Some good hills (from which grand panoramic views were obtained) were encountered on the way, but they were not unsurmountable. The woods added considerably to the prettiness of the drive. Altogether, therefore, it was a picturesque and enjoyable outing. The party made the Angel Hotel their headquarters, and much interest centred in the proceedings on account of the presence of some notable cars. For instance, Capt. J. S. Ruston, of Lincoln, drove over on a very fine 18-h.p. Mercedes, and Mr. J. D. Sandars, of North Sandsfield, and Mr. G. E. Sandars, of Scampton, each drove a Peugeot that won at the Southport Speed Trials last year, and which they afterwards acquired. Another interesting feature was a 20-h.p. Richardson, one of the highest powered cars, it is understood, the firm has yet introduced. Three 12-h.p. cars of the same make were also driven over by Lincoln motorists, viz., Capt. Newsum, Mr. C. W. Pennell, J.P., and Mr. H. White. Capt. J. A. Cole, J.P., of Roxholme Hall, brought the club's hon. sec., Dr. E. H. Cragg, of Billingborough, on his 14-h.p. Durrkopp, and other members were present from Gainsborough, Boston, Grantham, Market Rasen, and Sleaford, between 20 and 30 cars altogether putting in an appearance.

The committee held a meeting after luncheon. Captain Cole presided, and there was a representative attendance. The following were, briefly, the chief items of business which the meeting transacted:—A sub-committee was formed to consider what steps could be taken with a view to assisting the movement for producing denatured alcohol for commercial purposes. The invitation of Mr. C. Algernon Moreing (the Conservative candidate for the Gainsborough Division) for a meet at Riseholme Hall, on July 16th, was accepted. It was also decided to accept the invitation of Sir Charles Seely, M.P., for a meet at Sherwood either on July 23rd or August 6th, whichever was most convenient to Sir Charles. It was stated that the Lincoln members of the club were desirous of entertaining their fellow-members at Lincoln, and August 13th was fixed for the event. Mr. J. D. Sandars' invitation, to entertain the club during the last fortnight in September, was accepted, and in connection with this meet Mr. Sandars will organise a hill climb near Gainsborough. The date to meet the Sheffield Club at Ollerton (in the Dukeries) was fixed for July 2nd, and the hill-climbing competition at Market Rasen, in connection with Mr. A. A. Padley's invitation, for June 16th. A sub-committee was appointed to meet the members of the South Lincolnshire A.C. at Boston on May 12th to endeavour to arrange an amalgamation of the two organisations.

Tea was served for the motorists and their friends at the hotel between four and five o'clock, and very shortly afterwards the cars left for their various destinations.

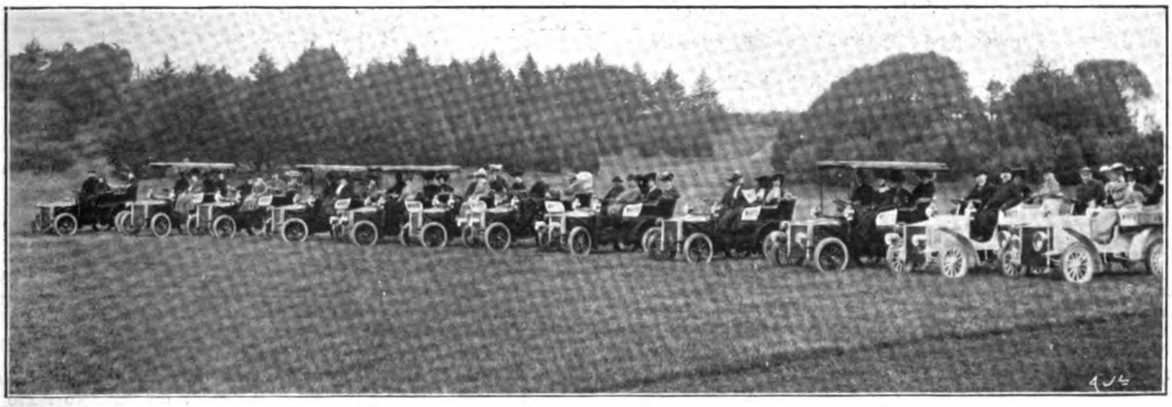
Manchester Automobile Club.—A week-end run to Leasowe, which is situated on the Wirral Peninsula, was arranged for Saturday last by the members of this club, where the headquarters for the time were at the Leasowe Castle Hydro. The meeting was entirely successful, the weather being everything that could be desired on Saturday, whilst just sufficient rain fell on the Sunday to lay the dust.

Midland Automobile Club.—An open hill-climbing competition is to take place on July 23rd, under the auspices of this club, on Sunrising Hill. Full particulars will be published on June 25th. The entrance fee will be £2 2s., except in the case of cars entered and privately owned by members, when the fee will be only £1 1*s*.

Yorkshire Automobile Club.—Runs for May have been arranged as follows:—May 7th, Cawthorne, *viâ* Huddersfield, meet Spencer's Arms Hotel at 5 p.m.; 14th, Bolton Woods, meet 5 p.m. Devonshire Arms; 21-24th (week end run), Lake District, headquarters Bellsfield Hotel, Bowness, Windermere Lake; 28th, York, meet 5 p.m. Station Hotel.

Blackheath Automobile Club.—At a meeting held last week it was determined to form a club under this title, the following gentlemen being nominated to the committee:—Dr. J. Strickland Goodall, Messrs. L. Beadle, H. Cunis, A. Duckham, L. C. Lambert, H. Norfolk, and S. Norfolk; treasurer, Mr. W. O. Bedford, R.N.; hon. sec., Mr. A. Roberts, Madgelands, Beaconsfield Road, Blackheath, S.E. By way of inaugurating its foundation the members arranged for a run last Saturday to Crown Point, Seal Chart, near Sevenoaks.

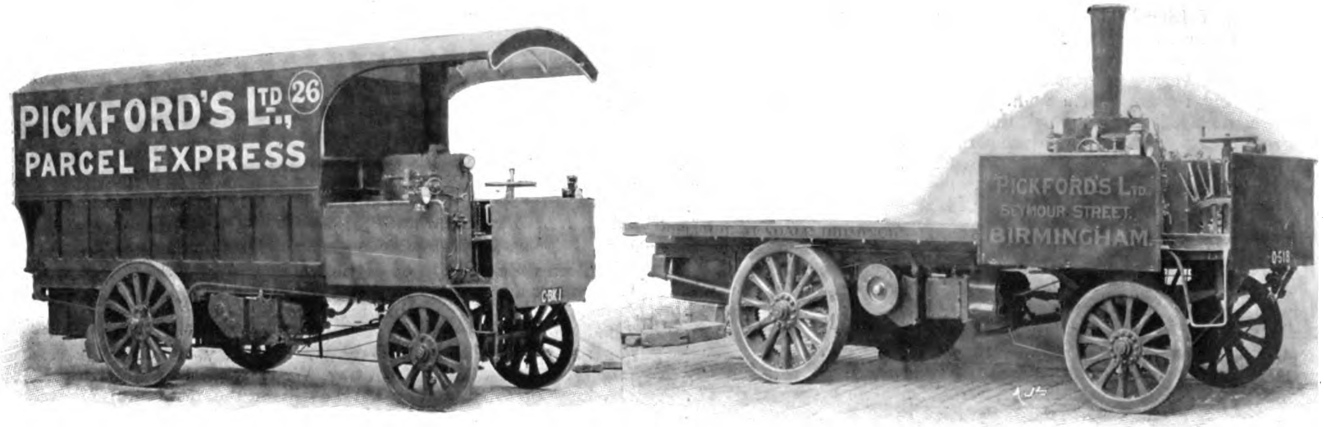
Automobile Club of Rhodesia.—A small gathering of enthusiastic automobilists in Africa foregathered at Bulawayo during the last days of March, when the advisability of forming a club for Rhodesia was discussed. The prime movers who attended this meeting were Messrs. C. Duly, A. R. Atkey, I. C. Walker, T. Hayter, L. W. White, W. E. Say, W. Harris, and A. E. Knowles. Mr. Duly presided, and for the benefit of the rest of those present Mr. A. R. Atkey, who is the hon. secretary of the Nottinghamshire Automobile Club, gave a *résumé* of the good work which a club of this sort could perform and how it could forward the interests of automobilism in almost every direction. He dealt with the educational work necessary in the earlier stages of club life, and was sure that a good-fellowship would be engendered through it amongst a large circle of well-wishers to progress in the country. It was unanimously resolved to form the club, and runs, lectures, &c., are to be at once organised. The organisers forthwith determined to take the sport of motor racing under the wing of the club. The subscription was fixed at two guineas per annum with an entrance



A fine show of White Steam Cars in the Golden Gate Park, San Francisco. The assemblage is distinctly remarkable when we consider that the whole muster consists of standard cars built by a single firm, and are all collected together in a comparatively out-of-the-way part of the world.

fee of one guinea, and by way of celebrating the inauguration of the club a very pleasant trip was made on Easter Monday last, with Matopos as the venue. The following officials were elected for the ensuing year:—President, G. H. Laidman, Esq.; vice-presidents, Dr. Strong and C. Duly, Esq.; hon. secretary and treasurer, Mr. A. E. Knowles; committee, Messrs. I. C. Walker, T. Hayter, L. White, W. E. Say, W. Harris, and F. Brooks.

A.C. of South Africa.—On April 11th the second annual dinner of this club took place at the Mount Nelson Hotel, Cape Town, when Mr. A. T. Hennessy, the president, occupied the chair, amongst those supporting him being Sir L. Michell, Colonel Crewe (Colonial Secretary), Mr. Rudyard Kipling, Mr. John Garlick, M.L.A., Mr. J. A. Graaff, M.L.C., Commander Clinton Baker (H.M.S. Gibraltar), Mr. W. Thorne, M.L.A. (Mayor of Cape Town), Dr. Viljoen, M.L.A., Mr. T. J. O'Reilly (ex-Mayor), Mr. Silberbauer, and Mr. E. Powell. After the usual loyal toasts were honoured, Colonel Crewe, replying to the toast of "Our Guests," given by Mr. D. P. de Villier Graaf, the Vice-chairman of the Club, related some amusing anecdotes in connection with the election campaign which had recently taken place, showing that the value of the automobile is as fully appreciated in Africa in this respect as in European centres. Sir L. Michell followed with "The A.C. of South Africa," which he proposed in very humorous terms, and specially congratulated the A.C.G.B.I. for the good work which they had done in the interests of automobilism. The President, in responding, was very emphatic in regard to due consideration being given in Africa by automobilists to other users of the road, and mentioned that the club had asked the local authorities to particularly deal with any automobilists transgressing the usual rules of courtesy on the road. He stated that in 1902, when the club was founded, their membership was 6, whereas now it totalled to 60. The club were establishing a system of hotel accommodation under special arrangements throughout the country, and he gave voice to the gratification which the whole of his brother automobilists felt at the hearty sympathy for the pastime which the Governor, who was himself a keen motorist, exhibited at all times. The final toast, prior to the usual vote of thanks to the chairman, was "The A.C.G.B.I.," the response to which was in the hands of Mr. Rudyard Kipling. Opening with some characteristic humorous remarks on the previous speeches to which the company had listened, he in similar strain said that he wished to protest as emphatically as lay in his power against the statement of some of the gentlemen that motoring was in its infancy. He knew the child. He did not say that he was present at its birth, but he helped to nurse the rickety thing along. The men that deserved a statue, the men that deserved the consideration, the love and affection, and reverence of their fellow men, were the men—"maniacs" they used to call them—who years ago laid their right shoulders to the wheel and pushed the whole thing along. Motoring was going on, and he would say on these roads it was going by leaps and bounds. If he had any power, he would only say that certain members of the Government responsible for these roads would be taken 18 miles an hour on a steam lurry six hours a day. Mr. Kipling told an amusing story of a visit to the Automobile Club at home, and the particular fads prevailing among the members in favour of their own pet types of machines. He said that he had heard many tales, but he had not heard the latest quotations in dead dogs. He had to come 6,000 miles from home to South Africa, and then he found that there was a boom in dead pigs. He did not know anything specially about it, but it seemed to be perfectly possible to go out motoring and conduct operations in pigs on a large scale at an approximate profit of about 25 per cent.



Messrs. Pickford, Limited, the well-known carriers, who are now employing motor vehicles in their business, have recently acquired the two wagons, a 5-ton wagon and a 2-ton van, seen in our illustration, from the English Steam Wagon Company, of Hebden Bridge. They are of similar general construction, and the rear wheels are gear-driven. Double-acting compound engines are fitted to them, and the boilers—which are fired from the top through a central shoot, are of a special fire tube type. A flexible drive is introduced by mounting the pinions, that engage with the internal gear-rings attached to the road-wheels, on radius rods which are swung from the stationary back axle, and also upon links that are, at the other ends, connected to the main frame. Provision is made for admitting high pressure steam to both cylinders when required, and the differential gear is so constructed that it can be locked when necessary. The wagon has a platform area, 12 ft. long by 6 ft. 6 ins. wide, and its rear and front wheels are respectively 3 ft. 9 ins. diameter by 6 ins. wide, and 3 ft. diameter by 5 ft. wide. The delivery van has a useful loading area of 52 sq. ft. and its boiler has copper tubes.

Auto-Cycle Club.—The hill-climbing competition of this club, open to members of the club only, which takes place on Saturday next, May 14th, will be held on a hill north of London, over a distance of about half a mile with a gradient of 1 in 10. Competitors will meet at the Old Salisbury, High Barnet, at 2.30 p.m. on the day, where final directions will be given. Only standard touring machines are qualified to take part. No pedalling will be allowed after the start, and should no rider succeed in reaching the top in any class the medal will be awarded to the rider who travels farthest without pedalling, should the judges consider the performance worthy. Five classes are provided for as enumerated previously in this journal, the entries for which closed last Wednesday.

Motor Cycling Club.—For the 24 hours' run from London to Edinburgh, starting on May 20th, organised by this Club, entries are steadily progressing, over fifty having already been received. The start will be from the General Post Office at 10 p.m., at half-minute intervals in the order of entry. The route and time table will be as follows:—Biggleswade, check by giving up ticket, no need to dismount unless petrol is required. Grantham, control and check, no rider to leave before 3.45 a.m. Arrangements will be made here for early breakfast, and for filling petrol and oil tanks, and also lamps (oil or carbide) at reasonable charges. Tuxford, check by ticket. Wetherby, control and check, no rider to leave before 8 a.m. Durham, control and check, no rider to leave before 11.30 a.m.; lunch will be served here. Alnwick, check by ticket. Berwick-on-Tweed, control and check, no rider to leave before 3.30 p.m. Dunbar, check by ticket, no need to dismount. Levenhall (Musselburgh), control and check, no rider to leave before 7.40 p.m. Finish, North British Hotel, Edinburgh, close to G.P.O.; check. Riders can obtain petrol at the following places: Biggleswade, Grantham, Wetherby, Durham, and Berwick-on-Tweed.

ST. LOUIS EXPOSITION.—The statue emblematic of "Transportation by Land."

UP to April 20th last the London County Council registered 2,914 motor cars and 2,063 motor cycles, 860 licenses to drive being issued up to the same date; 16 general identification marks for cars have been assigned to manufacturers or dealers.

ON the Basingstoke road at Hook a police trap has been set a little distance on the London side of Basingstoke. The distance is a quarter of a mile, easily recognised, as part of the measured strip is over a new railway bridge. It is worked by a plain-clothes sergeant and a constable in uniform, and Mr. Jarrott, as we mention elsewhere, has been one of the victims. Antipathy to motorists is rather prevalent on the local Bench, and automobilists should, therefore, keep well clear of the district.

THE Secretary of State for War has announced that no objection will be made to the use of motor cycles for carrying dispatches and orderly work by members of the Imperial Yeomanry Regiments. Characteristically, however, the head of the department refuses to allow the owners of motors to draw the equivalent of existing horse and forage allowance. We wonder whether the Secretary of War imagines that they can be kept in running condition for nothing. If so the allowance made to the motor volunteers is somewhat incomprehensible.

POLICEMEN are almost, we might say proverbially, weak in arithmetic, and this, perhaps, explains the extraordinary accuracy with which their stop-watches both invariably agree with one another, and operate so as to give an exact number of miles per hour, without fractions. A Reigate policeman, however, has been multiplying up his estimates evidently by a very erroneous figure, as in a recent case he made out the speed of a motor car through a local police trap to be as much as 818 miles an hour. This ought to provide a sufficient "margin" for any magistrate.

THE question of motor cars in Hyde Park has given rise to some discussion in the House of Commons. First, there was Mr. Bull, who, on behalf of Sir G. Bartley, asked Lord Balcarres whether he was aware of the inadequate character of the notices which were used to warn motorists against entering on certain roads in the Park, and whether he would cause properly conspicuous boards to be placed at each end of the roads prohibited. Lord Balcarres informed the House that the First Commissioner of Works had made inquiry, and "regretted that he could not find the present arrangement unsatisfactory." Well, they may not be unsatisfactory for people who know the ropes, but to our own experience a motor car owner of unquestioned position was driving quite innocently through Hyde Park the other day, and entered upon one of these forbidden roads from which offence there was absolutely nothing as far as he could see to warn him. As a result, he was treated with gross insolence by the police and ordered peremptorily to leave the road in question. We share the regret of the First Commissioner of Works that he cannot find this condition of affairs unsatisfactory, and we can only suggest that if he were a motorist he probably would. After all, it is a question whether other people find the situation unsatisfactory, and we could give the First Commisioner very ample evidence, if he desires to have it, to prove that they do.

MR. WASON has also been up again and bothering Lord Balcarres in Parliament to know whether motor cars are or would be restricted in speed in Hyde Park, Constitution Hill, and the Mall. The enquiry elicited the rather unexpected answer, viz., that speed in the parks is not limited by the 1903 Act but by the Parks Regulation Act of ten years ago, and that the police merely have instructions to summon persons driving in a dangerous manner. It is also of interest to learn that there has been only one case of the kind this year.

ST. LOUIS EXPOSITION.—The statue emblematic of "Transportation by Water."

THE automobile is to be introduced to assist in civilising the Congo Free State, and a special road is being constructed from Kimpesse to Luozi for the purpose. The total length of the road is to be 100 kiloms., and the district is said to be well suited to the purpose.

THE German Automobile Club has "very hospitably" invited all members of the Press to take places on the steam boats which the club has chartered for the Kiel Regatta. The places on the larger boat will be charged for at the rate of 5 marks, and those on the smaller vessel being 10 marks.

AUTOMOBILISM has not reached a very great degree of development in Norway, as we learn there are only at present some twenty-four cars in that country, mostly of American and rather antiquated make. This is not greatly to be wondered at as the roads are very mountainous and generally unsuitable. Still Norway could probably support more than twenty cars if they were stoutly and suitably made, and English manufacturers might look the matter up with advantage.

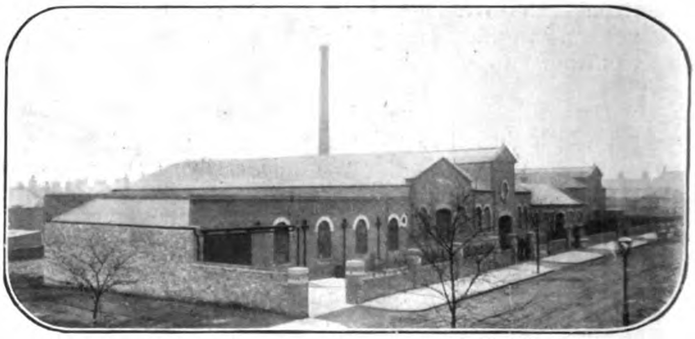
MR. ANDRE A. GODIN, of 1, Red Lion Square, Holborn, informs us that he has taken up the agency for the Dinin electric accumulators, with solidified electrolyte for ignition cells. These cells have the advantage of all similar arrangements of not causing any trouble through leakage or slopping out of the acid.

MR. HARRINGTON MOORE, who has been asked by Mons. C. L. Charley, of Paris, to represent him in connection with the Mercedes car in the United Kingdom, informs us that M. Charley proposes during the current month to arrange an extensive show, to include every type of up-to-date Mercedes cars, at his new Paris premises which he has recently secured at 70, Champs Elysées.

Enterprise is being shown by the Continental Caoutchouc and Gutta Percha Company, of 64 and 65, Holborn Viaduct, E.C., who are prepared to furnish particulars of routes, hotel accommodation, and other information required by English automobilists going over to Germany to witness the Gordon-Bennett race. The Company will also send their special guide book for Germany, of which a new edition has just been published, upon the receipt of 6*d*. to cover postage. This volume should be found of considerable use as a groundwork for those who like to study beforehand the districts through which they are likely to pass.

THE municipal demand for the motor 'bus continues to grow, and we are glad to be able to state that Messrs. Clarkson, Limited, have already delivered the 'buses ordered from them by the Eastbourne Corporation, and last week supplied one to the North-Eastern Railway Company for connecting up the country round Beverley to their line. Further similar 'buses are on order for the same railway company, the Eastbourne Corporation, and the Great Western Railway, and the company has received orders from the London General Omnibus Company, the London Road Car Company, and the Lake District Road Traffic Company, the latter company proposing to run a service from Windermere through Ambleside to Keswick. The Clarkson steam 'bus will be thus very much in evidence in a short time, and judging from the experience already obtained with it in Torquay, we may safely conclude that it will tend to promote the application of automobiles to 'bus propulsion.

MOTORISTS occasionally get into trouble for having their tail lights blow or burn out without their knowledge, the consequence occasionally being one of those agreeable *tête-a-têtes* with a magistrate for which few motorists, however familiar they may be with these functions, have any predilection. The United Motor Industries, Limited, are therefore introducing small electric lamps, which can be screwed in in the place of the burner of the oil lamp. By using two of these in series—one for one of the forward lights and one for the tail light, or employing a simple ammeter in series with the light where it is illuminated in some indirect way—the driver can always be certain that his rear light forms an illumination within the meaning of the Act. The same Company inform us that they are now putting on the market the Cremorne patent automatic carburettor, which was described in the columns of this Journal some time ago. The carburettor, which is giving very good results in practical working, is made in three sizes, suitable respectively for 3, 7, and 15-h.p. single cylinder cars, the same sizes being suitable for 5, 12, and 24-h.p. double cylinder cars, and the latter two, B. and C., for 16 and 30-h.p. 4-cylinder vehicles. The prices of these carburettors are 25*s*., 35*s*., and 50*s*. respectively.



THE "HOME" OF THE BROOKE CAR IS SEEN IN OUR PHOTOGRAPH ABOVE.—The standardising of this car has necessitated large extensions in the works at Lowestoft, and Messrs. Brooke and Co. have availed themselves of the opportunity of including also a Garage. The popular 1904 model of this make is the four-cylinder 15-20-h.p. Car.

DOINGS OF PUBLIC COMPANIES.

THE directors of the Ivel Agricultural Motors, Limited, have declared a 5 per cent. dividend on the first year's working.

THE directors of John I. Thornycroft and Co., Ltd., in their report for the past year, state that the considerable sum which has been expended in the establishment of a new branch of the business, viz., the supply of motors for marine purposes, has been entirely written off, whilst the results have been so satisfactory that they anticipate a profitable and increasing business in this direction.

NEW COMPANIES REGISTERED.

Halford Spring Wheel Syndicate (Limited), 2, Gresham Buildings, Basinghall Street, E.C.—Capital, £360 in £1 shares. First directors, H. S. Halford, J. G. Halford, and A. L. Gunn.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

Offices: 44, St. Martin's Lane, London, W.C.

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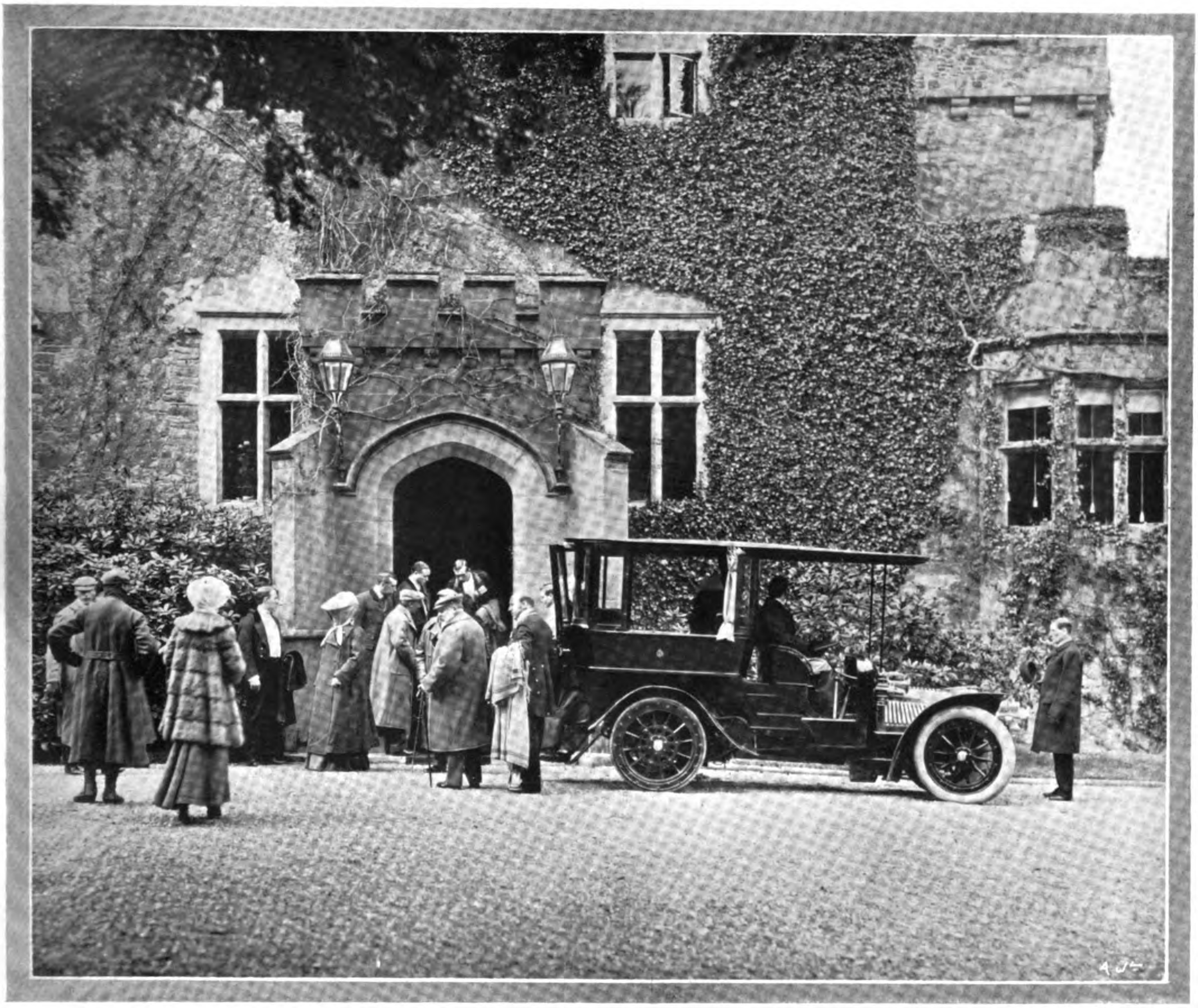

His Majesty King Edward has on his Irish Tour repeated the demonstration he gave in Scotland of the value of the automobile for reaching the most beautiful but often inaccessible parts of his Kingdom. He has been enabled by its means to see a number of the beauties of Ireland which it would have been impossible to have visited in the same length of time by the old means of locomotion. The photograph which we reproduce shows His Majesty at the hall-door of Lismore Castle, about to enter his new Daimler carriage on the way to Shanbally Castle to visit General and Lady Beatrice Pole-Carew, and Lady Constance Butler, to whom the property was left a few years ago.

THE AUTOMOTOR JOURNAL.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
May 14 ...	Auto Cycle Club Hill Climb.
May 19–20 ...	Glasgow-London Non-Stop Run.
May 28 ...	Auto Cycle Club Combined Run to Yarmouth.
May 28 ...	Nottinghamshire Club Hill Climb.
June 11 ...	Automobile Races, Ranelagh Club.
June 27–July 2	Motor Bicycle Endurance Trial.
July 26–27 ...	Reliability Trials for Motor Boats.
July 30 ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
1905.	
May 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May	Guadarrama Hill Climb (A.C. Spain).
May 11–15 ...	Milan Exhibition and Tourist Trial.
May 12–15 ...	Tours Tourist Trial.
May 20 ...	French Gordon-Bennett Race Eliminating Trials.
May 23–31 ...	Aix-les-Bains Week.
May 24 ...	Carburettor Trials (A. C. de France).
May 30–June 3	Circuit National Belge.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 15–23 ...	Ostende Week.
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 8-9 ...	Calais-Dover-Calais (motor boats).
Aug. 10 ...	Calais-Boulogne-Calais (motor boats).
Aug. 14–20 ..	Paris–Deauville Motor Boat Race.
Aug. 22 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Inconsiderate Driving Question.

The reorganised Automobile Club Committee has lost no time in commencing an energetic propaganda for the purpose of discountenancing, and as far as possible preventing, behaviour on the part of drivers of motor vehicles of the inconsiderate kind which has, as we have always maintained, been largely responsible for the hostility to the automobile movement which exists in many places. Everyone has felt that the expression of determination on the part of the leading body of automobilists in this country to put a stop to the evil will go further towards preventing it than any amount of police prosecution. It will also go further towards disarming popular hostility, for when the public feel that the Automobile Club is acting energetically against offenders they will come to recognise very rapidly that the offenders are nothing more or less than black sheep. Col. Holden, as chairman of the club committee, has addressed to the automobile and general press a circular letter which is both moderate and energetic in tone, and proposes the adoption of measures by the club which cannot fail to go a long way towards teaching the few people who have been bringing discredit on the great body of automobilists to mend their manners. We reprint this letter in another column, and it will be seen that the adoption of the proposals put forward are well calculated to have a very deterrent effect on any possible offenders who are either members of the Automobile Club itself or of any affiliated clubs, while it is suggested that even in the case of persons who are neither, the Automobile Club will be still able to make its power felt. We would be the last to suggest that the Automobile Club has not always discouraged excesses of the kind to which we refer. The more energetic steps which are now being taken will, we feel certain, be productive of the best results. There has been so much ill feeling, so much questionable evidence put forward by the police in cases of motor car prosecution, above all such contemptible tactics have been resorted to in the case of police traps to the irritation and annoyance not only of automobilists themselves, but of all fair minded people as well, that it cannot be wondered at if the supervision of the police, though fortified by the most drastic legislation, produces unsatisfactory results. It will be quite otherwise with the action of the Automobile Club. Every member of it, or of an affiliated club, and this means the bulk of the leading automobilists in the country, even if sometimes inclined to disregard the courtesies of the road, will shrink from conduct which may draw upon him the penalty of being called before a committee of his club, and possibly suspended or required to resign his membership. This will be a stigma which police prosecution, owing to the causes we have enumerated above, cannot fasten on anybody, and its deterrent effect will be sure to be proportionately greater.

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The Carriage Tax on Motor Cycles.

THE Lord Chief Justice has always been a popular personage, but we fear that if he were at present to find himself unexpectedly introduced into the centre of a gathering of motor cyclists he would not be treated exactly with effusion, for as the result of his decision in the appeal from Quarter Sessions brought by the Inland Revenue, motor cycles will now presumably be taxed to the tune of 15*s*. as carriages. Hitherto the motor cycle has been permitted to be exempt, being looked upon presumably as a bicycle in which the rider is assisted, but not entirely "drawn or propelled by mechanical power." The case originally came before the Bristol justices, who, in accordance apparently with the previous ruling of the Recorder in Quarter Sessions, dismissed the application for a summons brought by the Inland Revenue. From this decision the Inland Revenue appealed to the Divisional Court, with the result that the Lord Chief Justice ordered the justices to convict on the ground that the motor bicycle was none the less a carriage because it had a very uncomfortable seat. The extraordinary feature of the whole business is that the appeal appears to have been uncontested. We should have thought the Auto Cycle Club, or any and everybody in the country interested in motor cycling, would have seen that someone was put up in the Divisional Court to argue so important a matter against the Solicitor-General. The appeal was simply allowed to go by default. This is the more regrettable as one would naturally think a very good fight could have been made, and if the case had been properly argued it is probable the Lord Chief Justice would only have held that those motor cyclists were liable to the carriage tax in which no provision was made for pedalling. Someone has blundered badly somewhere, for from figures published the amount at stake is by no means small, it being estimated that there are from 10,000 to 12,000 motor cyclists in the whole country. If when such important interests as this are threatened there is not sufficient co-operation amongst the persons concerned to arrange and pay for the briefing of counsel in an appeal of this kind, the sooner motor cyclists improve their organisation the better.

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Danger to the Public at 7 Miles an Hour.

THE amazing workings of the magisterial mind have been almost, one might say from week to week, a source of amusement and exasperation to automobilists. Perhaps the most remarkable example in point is provided by the recent case of Mr. Vickers, who, together with a number of other defendants, was summoned before the Andover Bench for driving to the danger of the public. Mr. Firth, who, as usual, subjected the police witnesses to a severe cross-examination, elicited that the road was clear of vehicles, that nobody was endangered or even inconvenienced, and at the same time he hopelessly shook the evidence on which as usual they agreed with perfect equanimity, that the car was proceeding at 24 miles an hour. In the result the magistrates admitted that *they had considerable doubt as to the accuracy of the police testimony*, but concluded that, though the car was not as alleged by the policemen travelling at 24 miles an hour, it was undoubtedly going at 7 miles an hour and that this pace was dangerous to the public. After this to contest such cases seems to be little more than absurd, for, if magistrates after having admitted disbelief in the police evidence to such an extent as to divide their speed estimate by nearly four, and if in their opinion 7 miles an hour is dangerous to the public, even when there is no public about, it is plain that conviction cannot be evaded. Andover is an out of the way district to which enlightened ideas presumably percolate but very slowly. Fortunately magistrates more in the stream of events and nearer the metropolis are giving proof of a more propressive tone.

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Uniformity on the Lighting Question.

WE congratulate the Motor Union on the sensible course it is adopting in regard to the vexed question of compelling horse-drawn vehicles to carry lights at night. As we have already more than once pointed out, the matter is entirely left to the discretion of local county and borough councils, and, where they do not choose to enforce it, anyone who likes may render the roads dangerous by meandering about them in the blackest darkness without any evidence of his whereabouts but the rumbling creakiness of his wheels. At the same time the Motor Union sensibly recognises that the prospects of Parliamentary legislation on the subject are at present unfortunately remote, and they are accordingly adopting the wise expedient of directly approaching the local authorities concerned with the modest request that they might see their way to the adoption of a bye-law on the lighting subject which would meet the requirements of the case. This proposed model bye-law would compel all vehicles not only to carry the ordinary light in front, but in addition, what is almost more needed, a light behind, while he further suggests that where long lengths of timber are carried projecting in the rear of carts, a red light should be attached to the end of this dangerous obstruction. We feel sure that the common sense of local authorities will recognise to what an extent unlighted vehicles at night, though always dangerous, have become positively homicidal since the introduction of motor car traffic, and will in consequence adopt a favourable attitude to the very reasonable law proposed by the Motor Union.

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The Isle of Man Eliminating Trials.

SOMETHING very much like an indignation meeting of the competitors was held shortly before the trials were commenced, with the result that the minimum time arrangement, which was the regulation to which we last week took particular exception, was eliminated. The contest was accordingly much more like a race than it would have been had this rule been adhered to. Under the regulations, as altered by the omission of the "minimum time" provision, the trials have probably afforded the judges adequate data for selecting the best cars. Public interest in such an event is increased in proportion as the trial approaches the character of a real race, and, with the dangerous corners included in the numerous controls, accidents have been avoided altogether. The main point is that the public should be adequately protected, and this was amply provided for. The drivers themselves willingly take what risk may attach to a race, which, after all, is nct very much greater than is incurred in steeplechasing or hunting, and willingly encountered in a hundred worse causes than the promotion of an important industry. We should have been the last to minimise the amount of meritorious work and organisation which has been performed by the Races Committee, or to suggest that the rules they have formulated have not been admirably calculated to provide them with the information and data they desired to obtain, even if they have, as we previously suggested, and still think, been a little over anxious in their solicitude. But there is no doubt that everybody, competitors included, like a race, and that the more the committee see their way to permitting the character of such competitions to approximate to one, the greater will be the corresponding benefit to the car designers, builders, and drivers who compete. This the omission of the "minimum time" regulation has tended largely to effect, while of course it was still possible to time the competitors over the measured stretches on the flat and uphill, as originally proposed.

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The Significance of Indicator Diagrams—Professor Callendar's Paper.

Every automobilist has probably heard of indicator diagrams in connection with engines, but we feel sure that we shall not be accused of discourtesy if we suggest that there are a very great many of them who have but the haziest notion of what an engine diagram really is, or what its use may be. Everyone, however, has probably experienced a desire, particularly when they have reason to suspect that it is not working quite properly, to know exactly what goes on inside the cylinders of his engine, and many might even plead guilty to a wish, at times, that a portion, at any rate, of their cylinder walls were transparent, so that they might be able to witness the occurrences within. This, it is true, would do them very little good, as the rapidity of action is far too great for anything but a series of flashes, succeeding one another with enormous rapidity, to be observable. The indicator diagram, however, tells the man who has learned to read it, exactly what takes place within the cylinders, with quite sufficient accuracy to enable him to detect any faulty action that there may be. The diagram is simply a continuous record, extending over a certain period, of the pressure inside the cylinder at all points during the cycle of operations, and it is produced usually upon a paper in such a way that where the outward and inward strokes of the piston begin and end can be readily recognised. Putting it roughly, the length of the diagram laterally, along the paper, corresponds to the inward and outward strokes of the piston, and the height of the lines, at any point, to the degree of pressure inside the cylinder. The lines are usually drawn by an automatically controlled pencil that presses against the paper, and is connected by delicate mechanism with the engine. The pencil is caused to move up and down in accordance with fluctuations of pressure in the engine cylinder, and in so doing it *would* draw a straight vertical line up and down on the paper, if the paper were stationary. The paper is, however, also moved to and fro sideways, in step with the working piston, so that the pencil therefore executes curved lines on the paper, from the height of which at any point the pressure in the engine cylinder at that part of either stroke can be ascertained by simple measurement of the diagram.

Such facts as whether the explosions are occurring satisfactorily, whether there is any leakage which prevents the proper degree of compression being obtained, and above all whether ignition takes place at the right moment—that is to say whether the firing is too soon or too late—together with a number of other data, are thus all clearly shown and recorded on the diagram.

These are the principles on which the ordinary engine diagrams are obtained, but recently improved methods of obtaining diagrams have been introduced in which the pencil is dispensed with and a beam of light employed instead. The beam of light is reflected from a mirror to which a combined angular movement, corresponding to that of the pencil relatively to the paper, is imparted, and in this way a visible optical diagram is produced before the eyes of the observer. It was with an improved instrument of this class that the interesting experiments with which Professor Callendar illustrated his paper were performed. The apparatus possesses the advantage of much greater rapidity of movement than the pencil-paper diagram method, and enables effective diagrams to be obtained from a little engine running at over 2,000 revs. per minute, a speed with which the pencil method is incapable of coping. Professor Callendar's experiments were performed before his audience, and the diagrams produced by this optical method from an engine actually running projected on a screen. Everyone, therefore, who is not quite clear as to what an engine diagram means and all it can teach would do well to pay careful attention to Professor Callendar's paper, while those who understand the problem, thoroughly, will enjoy the description of the new and original methods adopted.

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Improving the Output of the Explosion Motor.

No one interested in the development and progress of the internal combustion engine, and in consequence we may say no automobilist, can afford to ignore the valuable and exhaustive lecture on "Internal Combustion Motors," delivered by Mr. Dugald Clerk before the Society of Civil Engineers, the third instalment of which we have been compelled to hold over until next week. Mr. Dugald Clerk is perhaps our leading expert on the explosion engine in this country. He invented the earliest two-stroke gas engine ever commercially used, and, as an instance of how much he was in advance of his time at that date, it is interesting to observe that many of the largest gas engines now made operate on the Clerk cycle. No one, therefore, can neglect what he has to say on a subject with which the future of automobilism is so intimately bound up. Being the "James Forest" lecturer, his remarks were necessarily more directed to the future prospects of his subject than to a *résumé* of past progress, although he gave many significant figures when making the necessary review of what had been achieved during the last twenty-five years. But this is as it should be, and their importance for the automobilist is all the greater on that account.

Mr. Clerk, under the circumstances of his lecture, naturally looked upon himself as an expert addressing a meeting of experts, and was in consequence highly technical and exhaustive. In fact, there are no doubt a large number of automobilists, and we might add a considerable number of engineers, who would readily confess that they are not sufficiently conversant with the difficult and complicated problems involved to appreciate the full bearing of all that the lecturer said. He dealt, too, with internal combustion engines of all kinds, and these now range in size from those developing one half, up to those capable of giving 2,000-h.p. Nevertheless, the lecture is of supreme importance to automobilists, and we therefore desire to direct their attention to some of the leading conclusions and suggestions made by the lecturer, without attempting to repeat the elaborate reasoning from theory and practice by which they were in most cases arrived at.

The fact which the automobilist will seize upon with the greatest avidity is that, as the result of his investigation and reasoning, Mr. Clerk has been enabled to introduce an improvement of the explosion engine by which the output and efficiency may be increased some 20 per cent.; that, at least, was what was attained in the case of a stationary gas engine to which the principle was applied, the thermal efficiency of which was thereby increased from 27·7 per cent. to 34·4 per cent. Motor car engines are, of course, considerably less efficient, and it is premature to enquire whether the improvement would in their case produce as great or a greater increase in efficiency. Should it do so, it will mean an important economy.

The principle itself is of considerable interest, and is very simple. It consists of introducing into the cylinder at the commencement of the compression stroke—*i.e.*, at the end of the usual suction stroke—sufficient air or inert gas to raise the pressure inside the cylinder to about 7 lbs. above the atmospheric pressure. This means a large increase in the subsequent compression pressure, with a resulting material increase of explosion pressure. Curiously enough, this increase in compression is not accompanied by a proportionate rise in the temperature of the mixture at the end of the compression stroke, the reason being that the additional weight of air added takes up a large portion of the extra heat due to the increased compression, and is even found to more than compensate for the rise of temperature that might be expected to result from the increased compression pressure. But the great point is that the temperature of explosion is actually decreased, since there is the same amount of fuel consumed as before, but the heat is distributed through a greater mass of gas. Therefore the relative quantity of heat that is lost in the cooling water and in the exhaust is considerably less. The increase in efficiency which has chiefly characterised the development of the explosion motor, in the past, has also been due to employing increased compression, but, previously, increases of compression have been accompanied by considerably higher temperatures. It is only too well known, also, that there are limits to the extent to which compression can be increased. One of them is set by the danger of pre-ignition. Other things being equal, we can go on getting more and more power out of a given engine until the temperature during compression rises to such an extent that the engine begins to fire before the dead centre is reached. It is the effective manner in which this risk is avoided in the Diesel engine that makes it so efficient; and it was the fact that this danger of pre-ignition, when using very high compressions, was prevented in the Banki engine, by the simultaneous injection of water spray, that made that machine so interesting.

Mr. Clerk points out in his paper that there are other causes which prevent an increase of compression producing its full effect when it is carried beyond a certain point. But these are of too subtle and abstruse a character to be dealt with here. Our readers will see from some of the diagrams accompanying Mr. Clerk's paper that the increase of indicated power is very marked when his system is employed, and we understand that an actual gain of 20 per cent. in available b.h.p.—for doing useful work—has been shown by the tests carried out by him, so that this gain is over and above the small amount of the power required for forcing the extra air into the cylinder. The apparatus employed is very simple, and can also be used for scavenging during the exhaust stroke, as well as for supplying the additional air charge at the commencement of the compression stroke. Inert gases may be used instead of air for the extra charge required, and these can, of course, be even more conveniently obtained—from the exhaust—and forced into the cylinder, by the waste pressure in the exhaust pipe.

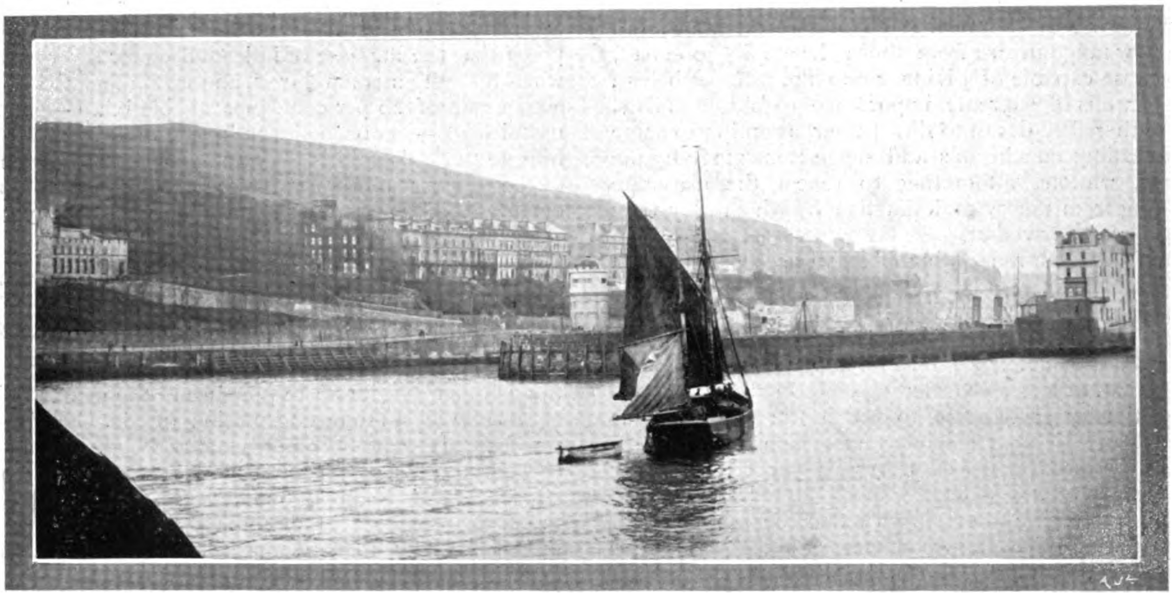
Not the least interesting portion of Mr. Clerk's paper was formed by the train of reasoning which he employed to show why his new principle produces this increase in efficiency. Everyone knows that the higher the gaseous pressure produced at the moment of explosion, and the more suddenly that pressure is attained, the more efficient is the engine, unless these two ends are obtained by producing too high a temperature. In that case, a considerable amount of the energy that should go to drive the piston is wasted in heating the cylinder walls, or by passing off in the exhaust gases, while in addition there is a further loss due to a variety of complicated causes which are dealt with very fully in the paper.

Mr. Clerk's principle enables the advantages of high compression to be obtained without the corresponding disadvantages of high initial temperature, which in hitherto existing systems of working have always accompanied it. It is not too much, therefore, to say that Mr. Clerk's method marks the greatest improvement in internal combustion engine practice that has been introduced since Banki discovered the results of injecting water-spray into the cylinder, and it promises to be practically, as far as can at present be judged, of much greater commercial value.

Mr. Clerk's paper also dealt with a large number of other considerations of only less importance than the above, and he has admirably pointed out that future improvements in the internal combustion engine can only be reached through elaborate research, far too expensive, costly and time-absorbing for any single individual to undertake. It is the sort of work which should be alloted to an institution like the Reichsanstalt in Berlin—if we had one—work of the kind that would undoubtedly be carried out were it not that much of it is of such a highly technical nature that the majority of those, who would otherwise bear the cost of it cheerfully, are unable to grasp its great importance to themselves.

We would desire to specially thank Mr. Clerk for his recognition of the fact that it is the way in which motor car engineers have been entirely untrammelled by precedents that has enabled them to effect such rapid progress. Nor can we refrain from mentioning the interesting data he provides in regard to improvements in gas producers of the Dowson type, which give ground for the hope that even very large engines fed with gas from cheap fuel, in this way, may, in the near future, be employed for marine propulsion.

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.



GORDON-BENNETT BRITISH ELIMINATING TRIALS.—The View on entering Douglas Harbour on Sunday last by the Special Steamer.

WHAT may be regarded as the official commencement of the Eliminating Trials took place on Thursday in last week with the proclamation on that day, on Tynwald Hill, of the Act for enabling the contest to be held in the island. As our readers are aware, every law in the Isle of Man must be publicly promulgated in order to have legal effect, and in fine weather the ceremony has its picturesque side. Unfortunately, on this occasion, the promulgation took place in a downpour, and a large tent had to be erected on the famous hill to keep the rain off his Excellency the Governor and those members of the Legislative Council and the House of Keys who attended. Mr. S. F. Edge, Mr. C. Jarrott, and Mr. Julian W. Orde placed their cars at the disposal of those who elected the automobile as the means for reaching the site at which the ceremony took place.

It was on Sunday that the majority of prominent motorists and those interested in the Trials—who had not already crossed over—took advantage of the special steamer which left Liverpool at 10 a.m. At first the weather was particularly unpromising, but fortunately the rain stopped soon after leaving the quay, and did not again give trouble until the afternoon, and then only for a short while.

As the "Douglas" is one of the smallest of the Isle of Man Steam Packet Company's steamers, some apprehension was felt by the "bad sailors" of the party, as a rough passage was anticipated. The crossing, however, turned out far better than was expected, and even the spirits of those who enjoyed it least revived considerably as the boat approached Douglas. Certainly, after the monotony of the six hours' passage, the sight of the picturesque bay with its background of undulating hills picked out with yellow gorse was extremely welcome.

In the bay was the cruiser, "H.M.S. Spartan," which attracted

Earl Russell and Major Lindsay-Lloyd interview the Captain of the "Douglas."

Mr. Luff Smith of the Wolseley Motor Company, and Mr. Lawrence, a member of the Midland A. C., submit themselves to the ordeal of the camera.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—En route for the Isle of Man per the s.s. "Douglas."

the attention of those on board before it was diverted to the large Sunday crowd on the quay, who were watching the approach of the boat. Among the passengers on board were: Mrs. Edge, Lord Russell, Col. Holden, Major Lloyd, Messrs. Napier, Johnson, Letts, Thompson Smith, Mumms, Boys, O'Gorman, Phillips, and Joy.

The Automobile Club's headquarters were at the Peveril Hotel, a most conveniently situated house for the purpose, having a large open space in front, where the standing cars proved an unending source of delight to the too-numerous small boys, who made perpetual pandemonium by "tooting" the horns.

On Monday the racing cars were officially weighed at three o'clock in the afternoon, and the ceremony took place in a rather unsavoury quarter of the North Quay, the weigh-bridge itself being situated in a coke-shed, admission to which was reserved for club officials and the Press. The result of the first weighing was to declare all the three Darracqs and Mr. Campbell Muir's Wolseley over 2,204 lbs. weight. Sacrificing the front wings was sufficient to pass the Wolseley racer,

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1.—Colonel Holden (in the centre), the Chairman of the A.C.G.B.I., holds converse with Mr. Mervyn O'Gorman and Earl Russell.

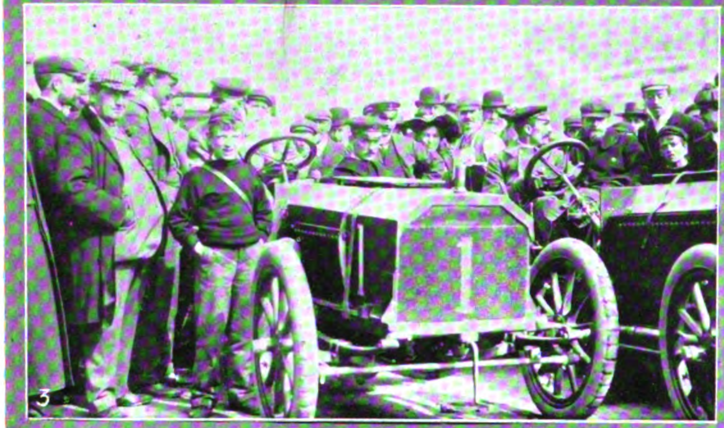
2.—Mr. Claude Johnson, Mr. W. Worby-Beaumont, and Mr. R. E. Phillips discuss points.

3.—Getting on board the "Douglas." Mr. Napier is in the centre of the picture.

4.—Mr. R. E. Phillips, Earl Russell, &c., appreciate the humour of a situation.

5.—The genial captain of the "Douglas" has a chat with Mr. Thomson Smith, Mr. W. M. Letts, and Mr. Brodtmann.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—En Route for the Isle of Man on Sunday last, per the Steamer "Douglas."



1.—Looking along North Quay, at the side of which the cars were weighed.

2.—The camera campaigners waiting for the weighing of the cars.

3.—Mr. J. W. Stocks and Mr. S. F. Edge waiting their turn to be weighed. Mr. Edge, accompanied by Mr. Napier, to the right; Mr. Stocks, seated in his Napier Car (No. 1), is conversing with Mr. Campbell Muir on the left.

4.—Mr. Clifford Earp returns on his Napier Car after being weighed.

5.—Mr. Mark Mayhew taking stock of his big Napier Racer.

6.—Darracq (No. 4) being towed back to headquarters after the weighing formalities.

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—The weighing formalities on Monday last.

but the Darracqs were seriously over weight, two of the three being 64 lbs. and 74 lbs. respectively above the limit; although one car was able to effect sufficient reduction of weight to pass, the others had to return to their garage until ten p.m. when they were again weighed. The *unofficial* weights of the various vehicles are given in our accompanying table. For the purposes of the electrical timing apparatus, for measuring the *instantaneous* speed of the cars, the wheel bases were measured at the same time.

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—The starting line at Quarter Bridge on Tuesday. Looking up the Course. Ready for the first car.

The sections and the scheduled times for covering them were as follows:—

	Distance. M.	Distance. F.	Sch'd time. Mins.
B.—Quarter Bridge to Ballasalla, Inward Control.	8	0	10
C.—Castletown Outward Control to Kirk Michael Inward Control, including Three Mile Speed Test and Stop and Start at Foxdale.	16	0	22
D.—Kirk Michael Outward Control to Ramsey Inward Control, including half-mile speed test after Ballaugh.	11	2	15
E.—Ramsey Outward Control to Willaston Corner, including hill-climb speed test on leaving Ramsey.	13	0	18

On Monday the "Supplementary Instructions to Drivers" were issued, and in these the most important alteration was the substitution of "scheduled" time (as annexed) for the "maximum" and "minimum" times previously arranged.

As will be seen from these times, the speeds are 48 m.p.h. for the first two sections, 45 m.p.h. and 43 m.p.h. for the last two respectively. The consensus of opinion was that the course was a very hard one, and that the scheduled times would take some keeping. During the preliminary canters two of the Napier cars suffered slight misfortune. On Saturday one of them ran into a wall at Ballasalla, and broke the front wheels, and on Monday morning Mr. Mark Mayhew's car bent her front axle through skidding on to a bank at the roadside. So far from preventing this car from appearing at the weigh in, it did not even prevent the car from being driven straight to the garage after the mishap, and, after being under the hammer, the axle looked as good as before. It was also

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—Looking towards the Starting Point at Quarter Bridge on Tuesday.

Photo by Cowen, Ramsey.
In Garwick Glen, 5 miles from Douglas.

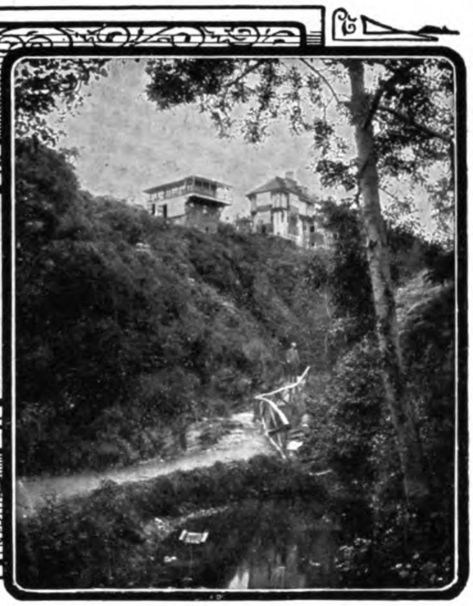


Photo by Valentine and Sons.
In Growdle Glen, near Douglas.

provided, in the revised instructions to drivers, that an addtional speed test over a 3-mile stretch would be made, commencing at the third milestone beyond Castletown. It will be seen from our map of the course, published in our last issue, that this spot is between Silverburn and Foxdale, and the test, therefore, added no small interest to a part of the course which was previously devoid of any special significance.

On Tuesday morning, although the Eliminating Trials were not timed to begin before nine o'clock, the inhabitants of Douglas, at any rate, were mainly astir by six, both the "oldest inhabitants" and the visitors at the hotels proceeding to take up positions on the course which they had doubtless previously selected.

Shortly before nine o'clock, a small crowd of club officials and a not very numerous collection of spectators had assembled to witness the commencement of the competition. Among the latter was Lord Raglan, the Lieut.-Governor of the Island. The crowd was not excessive, at any rate compared with the Gordon - Bennett experiences of last year, at any point of the course, for both the inhabitants and those who had travelled to the Isle of Man to witness the event had wisely distributed themselves fairly equally over the whole course, displaying perhaps a certain amount of partiality for the steep slope on the side of Snaefell, from which what was regarded as one of the most risky portions of the course was clearly observable. Compared, however, with the assemblage in Ireland last year, the number of spectators was small. The greater portion of the course was kept by the farmers and labourers sworn in as special constables for the occasion, and that they did their duty well was shown by the result that no accident of any kind occurred to the public excepting a slight mishap in the case of Miss Mason, of the Peveril Hotel, whose pair of horses took fright at one of the racers—the particularly noisy Darracq—with the result that the occupants of the carriages were thrown out, though without suffering any serious injury.

The method adopted for ascertaining the relative rates of acceleration attainable when starting from the Quarter Bridge Out-Control, was as follows: — The actual starter, Professor Boys, provided with a stop-watch, a large white flag, and a red flag, stood at various distances for each circuit—about 200 yards or so—from the starting line at which the car was brought to rest. The out-control keeper, Major Lindsay Lloyd, stood with a red and white flag immediately behind the car, and with the latter signalled to the starter when the driver was ready. Professor Boys, the starter, simultaneously with dropping his white flag, started his stop-watch, the dropping of the flag being the signal to the driver to "go," and stopped his stop-watch as the front wheels of the car came opposite to him. Major Lloyd was provided with the red flag in order to be able to notify the fact to Prof. Boys should the driver have started before the proper time, and the object of Prof. Boys' red flag was to signal to the driver to stop and go back to the starting line should the car have moved before the white flag had been dropped.

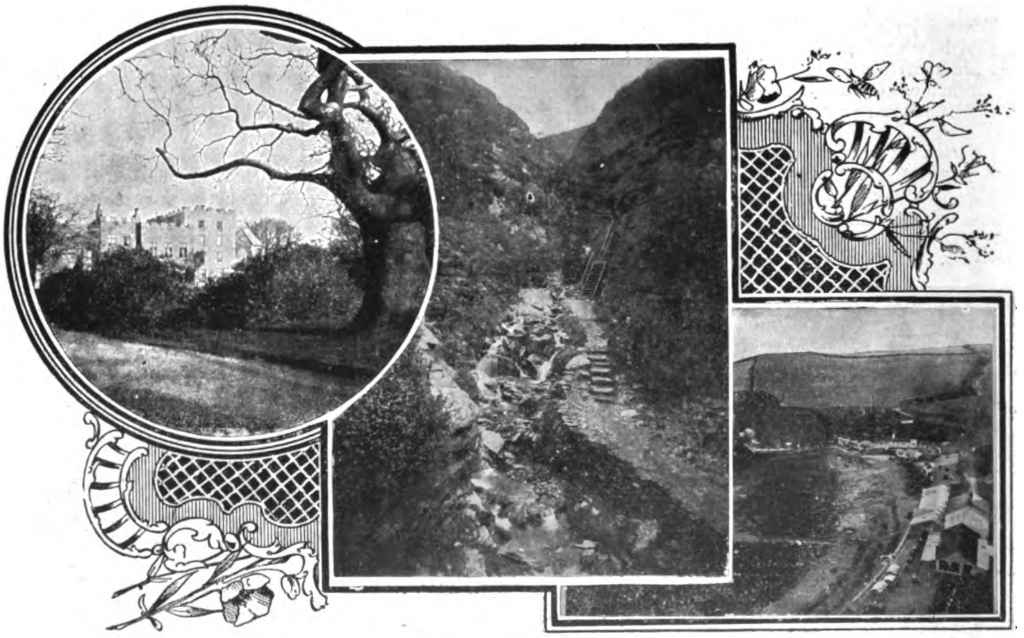


Photo by Cowen, Ramsey.
Bishop's Court, the residence of the Bishop of Sodor and Man.

Photo by Welch and Sons.
In Sulby Glen, near Ramsey.

Photo by Bird, Bath.
Port Soderick Reach, 4 miles from Douglas.

The Isle of Man Gordon-Bennett Eliminating Course.

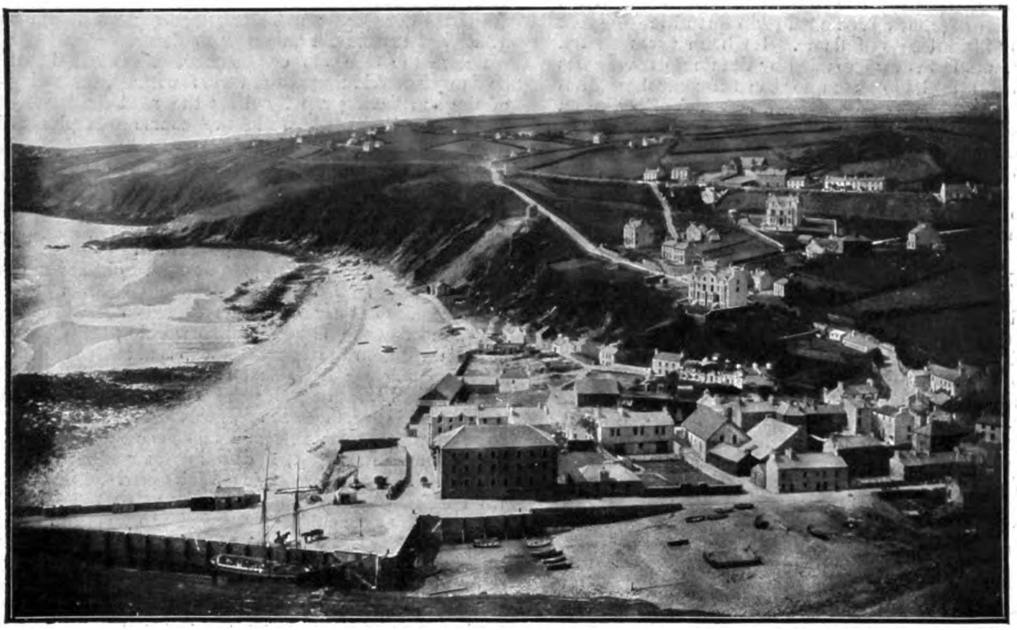


Photo by Cowen, Ramsey.

The Isle of Man Gordon-Bennett Eliminating Course.

Laxey Beach, 7 miles from Douglas.

At five minutes to the hour, the first car—the Napier driven by Mr. Stocks—moved up to the starting-point, and at the combined signal given by Professor Boys and Major Lindsay Lloyd, who started the cars, got away without a hitch, and rapidly gathered speed. All the first seven cars made satisfactory starts, the first, Wolseley "Beetle," driven by Mr. Campbell Muir, attracting a good deal of attention, while both Mr. Edge and Mr. Jarrott were heartily cheered by the spectators on leaving the starting-post.

After all but one of the Napiers and the Wolseleys had successfully "gone away," the Darracqs, which had arrived behind time, were sent off. They effectively provided one of the principal sensations of the contest. The first one was driven by M. Henri, but the conditions of starting did not appeal to him. When instructed to move up to the starting point, he made a flying start from the spot at which he had been waiting the summons to move to the starting point. Then came the Darracq driven by M. Edmond,

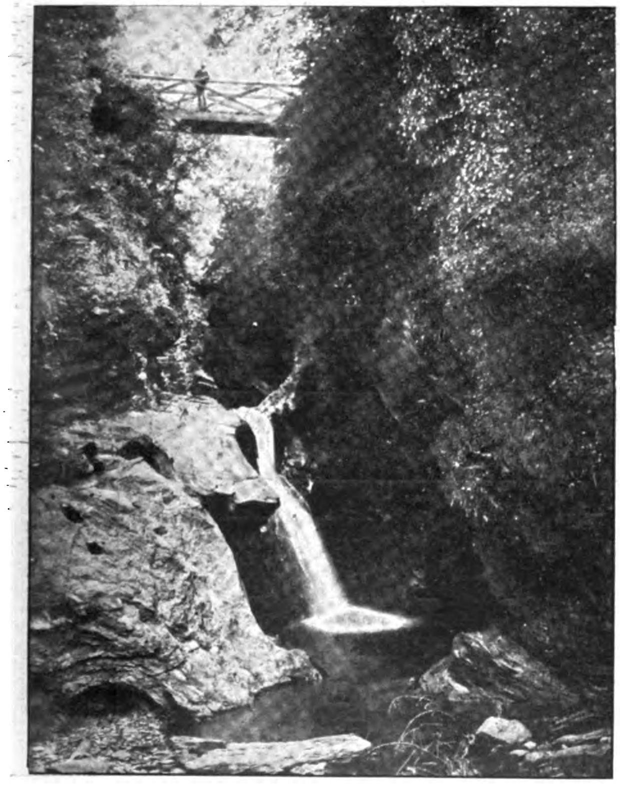


Photo by Cowen, Ramsey.

Glen Maye Waterfall.

Photo by Cowen, Ramsey.

Glen Helen.

The Isle of Man Gordon-Bennett Eliminating Course.

and that made a scarcely less sensational *début* than the other. When it came up to the starting post, it belched forth quantities of black smoke illumined by lurid flashes of flame. Its bonnet was off and its wings removed, and it was accompanied by titanic noises. It was this apparition that proved too much for the self-control of Miss Mason's horses. The third Darracq, driven by Mr. A. Rawlinson, dropped the end of its propeller shaft about a hundred yards from the start, so it, too, unfortunately, passes out of this description.

When the cars came round the first time, Hargreaves, on the second Napier, had overhauled Stocks, and arrived at Willaston Corner some two minutes before him. Both these first Napiers made the round in about an hour and a half, including the controls. Edge, who was the third arrival, bettered the performance of the first two racers, getting round in 1 hour and 22 minutes. Three out of the five Napiers therefore did very well in the first round. In his first round Jarrott, who was driving one of the Wolseley "Beetles," made exactly the same time as Edge. In fact, the cool and determined bearing both of Mr. Edge and Mr. Jarrott strongly impressed the spectators. Mr. Clifford Earp, who drove another Napier, produced also an excellent effect by his unfailing *bonhomie* and good humour. His optimistic attitude was probably the result, perhaps partly also the cause, of the excellent way in which his machine ran throughout, making apparently the best time of all the competitors. When completing the first lap, Edmond, driving one of the Darracqs, refused to pull up at the control, being understood to remark that he had lost enough time already. But as a matter of fact, owing to the failure of his brakes, he was unable to stop immediately, and here he too went out of the story.

On the second round, progress was less regular. Mr. Campbell Muir, who had suffered from puncture and various other troubles during the run, retired, these troubles sufficing to make further running inadvisable, and Mr. Muir took his car off the course. On this round, too, the impetuous Henri nearly ran down Major Lloyd. Col. Mark Mayhew, whose car was, however, not going very well, passed Hargreaves and Jarrott, both in difficulty, and Edge came in a few minutes later. At the end of the second circuit, in which Col. Mark Mayhew finished last, there were only seven competitors left, viz., five of the Napiers and two of the Wolseleys.

In the third round Edge did extremely well and gained some 24 minutes on Stocks, which meant high-speed running, as Stocks was still going very strong.

On the fourth round, Jarrott lost a good deal of time owing to a puncture, and it was on this round, too, that Edge had his first trouble. This was due to the puncture of the carburettor float, which caused an overflow of petrol that caught fire, but fortunately did little damage except to the tyres. On this round Col. Mayhew had to retire, owing to a broken spring, near Ballasalla, but Earp and Hargreaves were still going well.

Trouble overtook Stocks, in the fifth round, owing to leaking water-pipes, and Earp accordingly gained on him considerably. It was in this final round that Edge was further delayed by having to change a tyre. As both Edge and Jarrott had serious delays during the race from punctures and other causes, it is evident that when going well they must have done some tremendous travelling.

We append a table of the unofficial times round the course. It will be clearly understood that these must be looked upon as merely approximate, since they include the unknown times taken up in the controls, while they at the same time omit the stops at Quarter Bridge. As the times occupied in the controls by the different cars, when allowed to pass through, are not necessarily the same, the times occupied on the running stretches of the course cannot be arrived at from the data now available.

Before the race was commenced, it was feared that there would be danger of skidding at the various corners, but owing to the heat of the sun having rapidly dried the roads, all danger from this cause was eliminated, while the course was pleasantly free from dust.

Both the organisers of the race and everyone concerned, are to be congratulated on the admirable way in which it was carried out and the complete absence on the course of even the most trifling accident either occasioned by the cars to the general public, or by the competition to those taking part in it.

The attention of the public cannot fail to have been drawn to the fact—already familiar to automobile engineers—that actual experience of motor car building is needed to enable motor cars to be built, and that the best engineers, working with the best designs, cannot expect on the first attempt to build satisfactory racing cars.

Concerning the individual cars, breakdowns were perhaps comparatively few, considering the nature of the trials; though it is naturally difficult, in an event of this kind, to obtain full information as to what occurred at all points on the course. Summarising these briefly, and taking the cars in their starting order, the only mechanical trouble experienced by Mr. Stocks was apparently from leaking water tubes. The cause of the breakdown of M. Edmond's Darracq during the first lap was primarily the bursting of a lubricator pipe, but it was also said that the steering gear, as well as the brakes, were responsible for no little trouble. The Napier car, driven by Mr. Hargreaves, was delayed through a tyre coming completely off, and he also had other troubles with the tyres, including a burst. The Darracq driven by M. Henri suffered from imperfect brakes, for it was compelled to retire owing to the brake-bracket on the offside having broken loose. Mr. Earp's Napier, which was the only racer fitted with Palmer tyres, ran through without any punctures or other troubles, but Mr. Muir on his large Wolseley was neither so fortunate with his tyres, nor so free from difficulties occasioned by the mechanisms; a broken change-speed-lever was responsible for his retirement after the second lap. Mr. Edge was delayed on more than one occasion by tyres coming off or by punctures, but his most serious delay was apparently caused from an injured float in the carburettor causing petrol to overflow and to become ignited; the conflagration fortunately appears to have done but little damage except to the tyres. The Wolseley driven by Mr. Girling needed one of the rear tyres to be changed on the second lap, and at one time, we believe, the car was running on three cylinders only. The Darracq, driven by Mr. Rawlinson, has already been referred to above, and was the first car to drop out of the competition, with a propeller-shaft broken immediately after the start. Mr. Jarrott, though his Wolseley continued running well to the end, was handicapped by his "first" and "reverse" being smashed, and by having to use his "second" for starting, he was also delayed with punctured tyres. The large Napier car, driven by Mr. Mayhew, was not only compelled to change the front axle, which had been damaged and restraightened prior to the contest, but was further unfortunate in breaking one of the springs, this preventing it from continuing further.

The demeanour of the different competitors was almost as varied as the behaviour of the cars which they drove. Edge crouched slightly forward—cool, collected, and keen as usual, though looking

Order of Start.	Official No.	Description and Driver.	Weight.	Wheel Base.		Unofficial and Approximate Time occupied in completing the Course.					
						1st Lap.	2nd Lap.	3rd Lap.	4th Lap.	5th Lap.	Average Time per Lap.
			lbs.	ft.	ins.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
1	1	55-h.p. Napier (Stocks)	2029	7	6¾	1 38	1 29	1 27	1 19	1 45	1 32
2	3	65-h.p. Napier (Hargreaves)	2173	7	8½	1 27	2 0	1 26	1 31	2 26	1 46
3	6	65-h.p. Napier (Earp)...	2170	7	8½	1 27	1 32	1 35	1 33	1 21	1 30
4	7	96-h.p. Wolseley (Muir)	2197	9	0	—	—	—	—	—	—
5	9	80-h.p. Napier (Edge)	2194	8	10	1 22	1 23	1 20	1 45	1 49	1 32
6	10	72-h.p. Wolseley (Girling)	2200	8	7¾	1 40	1 23	1 15	1 30	1 41	1 30
7	12	96-h.p. Wolseley (Jarrott)	2204	8	11	1 20	1 46	1 31	1 44	1 27	1 34
8	4	90-h.p. Darracq (Henri)	2251*	—		1 43	—	—	—	—	1 43
9	2	90-h.p. Darracq (Edmond)	2284*	8	4½	—	—	—	—	—	—
10	14	100-h.p. Napier (Mayhew)	2197	10	10¼	1 46	1 39	1 40	—	—	1 42
11	11	90-h.p. Darracq (Rawlinson)... ...	2274*	8	4	—	—	—	—	—	—

* Weight limit 2,219 lbs. (15 lbs. allowed for magneto), first weigh in.

somewhat annoyed, as is not unfrequent with him when driving in a big event. His supreme mastery of his car was illustrated each time it started by the instantaneous manner in which it sped forward like an arrow shot from the bow. Jarrott, on the whole, appeared more anxious than usual. There was less of the *debonnair* good humour, and a certain suggestion of apprehension. Perhaps it was the course, perhaps it was the type of car, which he had not before driven in a great event, but his performance was a fine one. Earp, perhaps, was the most even-tempered of anybody. He seemed as happy and comfortable and as confident in his car as if driving for a Saturday afternoon outing in some county where the dread of Sergeant Jarrett is not known. He was confident both in himself and his car, and his car rewarded him in consequence. Girling, too, was singularly cool and calm throughout the whole competition. Stocks appeared to feel the strain perhaps more than most of the drivers, while Campbell Muir, though meeting with the worst of luck, preserved the best of tempers and drove his car off the course, observing that though the engine was a bit damaged, he meant to keep something in reserve for to-morrow. Col. Mark Mayhew was perhaps the most careful of all the competitors, and the ill-luck he met with was most undeserved. Mr. Kirk, on his 60-h.p. Mercedes, went round the course at the conclusion of the day notifying the "finish."

A club dinner subsequently took place at the Mona Hotel, Douglas, to which the Governor, Council, and Keys were invited.

On Wednesday the cars were tested on Port E Vullin Hill, between Ramsey and Maughold. The results we give herewith. No Darracqs took part, the other cars all travelling well.

Results (three attempts) for ½ mile up Port E. Vullin Hill.

No.	Car and Driver.	1st.	2nd.	3rd.	Average.
		secs.	secs.	secs.	secs.
1	Napier (Stocks)	$58\frac{2}{5}$	$57\frac{1}{5}$	$55\frac{1}{5}$	57
3	Napier (Hargreaves) ...	$50\frac{3}{5}$	$52\frac{2}{5}$	$51\frac{2}{5}$	$51\frac{2}{5}$
6	Napier (Earp)	$44\frac{3}{5}$	43	$43\frac{4}{5}$	$43\frac{4}{5}$
9	Napier (Edge)	$38\frac{3}{5}$	43	$43\frac{4}{5}$	$39\frac{3}{5}$
10	Wolseley (Girling)	$44\frac{4}{5}$	$44\frac{3}{5}$	$43\frac{3}{5}$	$44\frac{2}{5}$
12	Wolseley (Jarrott)	$47\frac{3}{5}$	$48\frac{2}{5}$	$51\frac{3}{5}$	$49\frac{1}{5}$
7	Wolseley (Muir)	$49\frac{4}{5}$	52	$50\frac{4}{5}$	$50\frac{4}{5}$

PROPOSED HEAVY TRAFFIC REGULATIONS.

THE Departmental Committee appointed by the Local Government Board to enquire into the suggested increase in the tare limit, and the other requirements for regulating heavy motor car traffic, have got their report practically ready. The members of the Committee, as our readers will remember, are Mr. H. Hobhouse, M.P., Sir W. Arrol, M.P., Mr. H. C. Monro, Mr. H. H. Law, Mr. G. F. Deacon, and Mr. H. G. Harris. In addition the Committee have drawn up a number of regulations which they suggest would meet the case, and considering the progressive attitude hitherto adopted by the L.G.B. it is probable that these proposals will be embodied in formal regulations at an early date. It will be seen that the Committee, whose names are a guarantee of their impartiality, have been careful, while protecting public interests in a satisfactory manner, to bear in mind the increasing importance of this branch of the industry, and to do their best to afford it a considerable degree of relief.

The following is the text of the Committee's recommendations :—

(1) That the *maximum* weight of 3 tons and 4 tons for unladen motor cars mentioned in Section 1 of the Locomotives on Highways Act, 1896, shall be increased to 5 tons and 6½ tons respectively.

(2) That the total gross weight on any one axle of a motor car when laden shall not exceed 8 tons.

(3) That every motor car which exceeds 2 tons in weight unladen shall be marked conspicuously on its right or off side with (*a*) the weight of the car unladen, and (*b*) the gross weight to be carried on each axle when laden.

(4) That these weights shall be certified, when the motor car is registered, by an officer of the registering authority who has seen the vehicle weighed when unladen, and each axle of the vehicle weighed, when laden, that the motor car shall not be registered without this certificate, and that the weight so certified shall be entered in the register for motor cars.

(5) That any motor car registered as being over the unladen weight of 2 tons before the issue of new regulations shall be liable to be weighed and re-registered, but without any further charge by the registering authority.

(6) That every "trailer" (*i.e.*, a vehicle intended to be drawn by a motor car) shall be conspicuously marked on its right or off side with its weight unladen, and, if such weight exceeds 1 ton, with the gross weight to be carried on each axle when laden. The gross weight to be carried on any one axle of the trailer shall not exceed 4 tons.

(7) (*a*) That in the case of metal tyres the width of the tyre of every wheel of a motor car exceeding 2 tons in weight unladen shall be regulated as follows :—If the wheel is 3 ft. in diameter the width of the tyre shall be not less than ½-in. for every 7½ cwt., or fraction of 7½ cwt., of the certified gross weight to be carried on the axle to which the wheel is attached. If the wheel exceeds 3 ft. in diameter the foregoing rule shall apply, with a proportionate increase above the 7½ cwt. in the ratio of 1 cwt. for every 12 in. increase in the diameter of the wheel. If the wheel is less than 3 ft. in diameter the foregoing rule shall apply, with a proportionate decrease below the 7½ cwt. in the ratio of 2 cwt. for every 12 in. decrease in the diameter of the wheel. Provided always that the width of tyre shall in no case be less than 5 in. (*b*) That in the case of a motor car exceeding 2 tons in weight unladen, and in the case of a trailer exceeding 1 ton in weight unladen, the diameter of any wheel having a metal tyre shall not be less than 2 ft. (*c*) For the purpose of the above measurements the diameter shall be the extreme diameter of the wheel measured from the outside of any tyre or other portion of the wheel which will come into contact with the ground.

(8) That the width of the tyres of a trailer exceeding 1 ton in weight unladen, and having metal tyres, shall be regarded in the same way as the tyres of a motor car, gross weights marked, on the vehicle being substituted for certified gross weights.

(9) That metal tyres shall be smooth and flat, provided that the tyres may be either solid or constructed with diagonal cross plates having parallel spaces between the plates so arranged that any straight line drawn across the width of the tyre parallel with the axle shall be in contact with metal for at least seven-eighths of the total width of the tyre. The above requirements shall not prevent the bevelling of the edge of the tyre for not more than one-tenth of its width on either side. [We consider that there would be an advantage in having the edge of the tyre slightly curved, so as to avoid a cutting edge on the road surface.]

(10) That the *maximum* speed of a motor car shall be regulated as follows :—(*a*) In the case of a motor car having its wheels fitted with metal tyres the speed shall not exceed—(i.) 8 miles an hour when the certified gross weight on any axle exceeds 3 tons, and does not exceed 6 tons ; (ii.) 5 miles an hour when the certified gross weight on any axle exceeds 6 tons, or when the weight of the vehicle unladen is 3 tons or over 3 tons and a trailer is used. (*b*) In the case of a motor car having its wheels fitted with non-metallic resilient tyres the speed shall not exceed 12 miles an hour when the certified gross weight on any axle exceeds 3 tons and does not exceed 6 tons.

(11) That the width of a motor car of, or exceeding, 3 tons in weight unladen, or of a trailer drawn by such car, shall not exceed 7 ft. 6 in. between its extreme projecting points.

(12) That the officer of any highway authority shall have power to require the driver of a motor car exceeding 2 tons in weight unladen, which may be within a quarter of a mile of a weighing machine, to proceed thither for the purpose of weighing the motor car or trailer with the load which it is carrying in such a manner as to ascertain the weight upon each axle. If the weight on any axle thus ascertained exceeds the weight marked on the vehicle in respect of that axle, the driver or person responsible for the load shall be deemed to have committed an offence against the regulations.

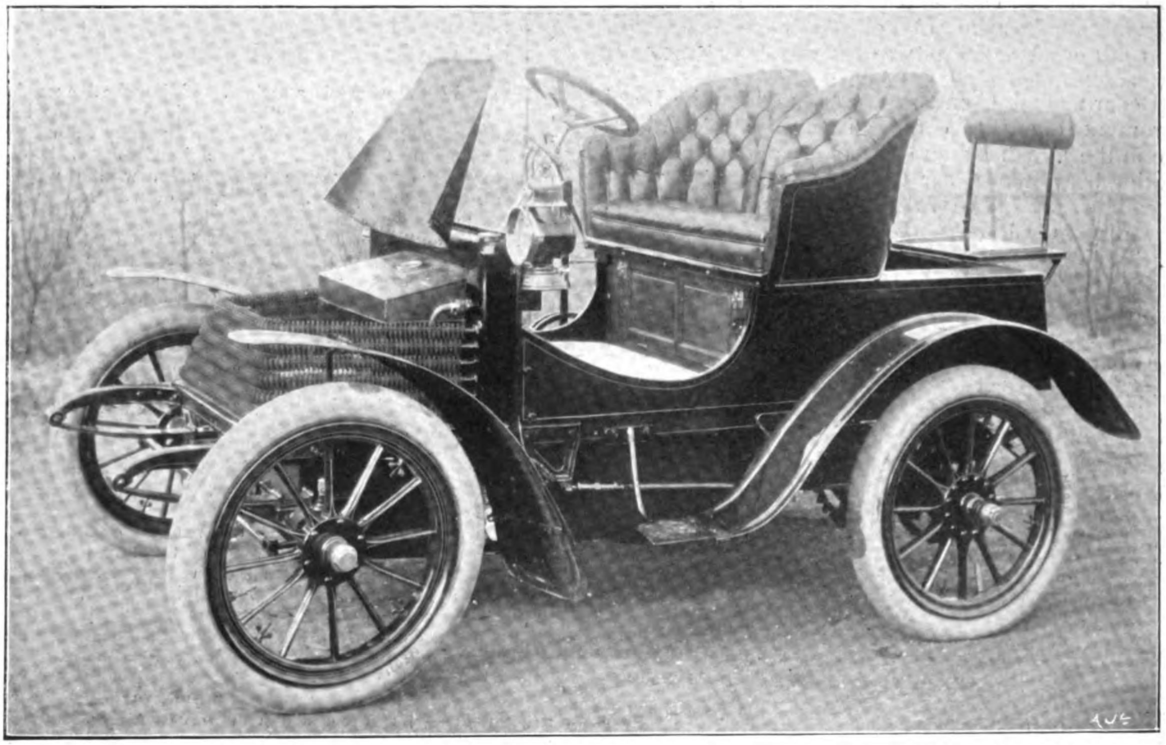
(13) That no motor omnibus or other passenger motor of, or exceeding, 3 tons in weight unladen, shall be used to draw a trailer.

(14) That every motor car of, or exceeding, 3 tons in weight unladen, and every trailer shall be constructed with springs on each axle.

THE WOLSELEY 6-H.P. VOITURETTE.—PART II.

The Engine.

THE engine is of very similar design to that on the larger Wolseley cars, but, as it differs entirely from those of other makers, and as it is some time since we dealt fully with these makers' vehicles, a detailed description will doubtless be welcomed by many of our readers. It has a single horizontal cylinder, but the cylinder proper is merely a cast-iron liner that fits into the large aluminium casting that forms the crank-chamber and the water jacket. The head, which contains the valves and the ignition-plug, is a separate water-jacketed iron casting. The cylinder liner and the head are both secured in place, to one another and to the aluminium casting, by the same studs, and the metal face joints between them are made on the taper. The construction is well shown in the sectional drawings which we give in Fig. 8, and the engine itself is clearly visible from in front and behind the dash, respectively, in Figs. 6 and 7.



A 6-h.p. Wolseley Voiturette, fitted with folding Spider Seat behind. The top of the Bonnet is raised, rendering the Petrol Tank visible.

The shape of the large aluminium casting, B, is best seen in Fig. 8, where it will be noticed that it fits up beneath the two channel cross members, A, of the main-frame, and that it is fixed in place in the chassis at these points. The crank-chamber proper is of unusually large size, and that portion of it which forms the water-jacket projects forward in the car. The engine lies centrally beneath the dash, with the crank-shaft, B^4, lying transversely almost immediately below it. The main bearings for the crank-shaft have their brasses formed in two parts, and these are held together by the caps, B^1, that fit down into large slots in the sides of the main casting, and are held down in place by nuts above. A large inspection cover, B^2, is fitted immediately above the crank-shaft, and this has gauze windows at each end for allowing air to pass in and out freely. The cover is held down by four wing nuts only.

The cylinder liner, B^3, makes a water-tight joint at each end, against the casting, B, when it is bolted up in place, and it is so shaped that a large water-jacket is formed around it. The cylinder-head, D, has an entirely distinct jacket of its own, and it constitutes a valve-chamber in which both valves are placed vertically, the atmospheric inlet-valve, D^1, lying above the exhaust-valve, D^2. The inlet valve is, as usual, removable complete with its seat, and the seating is held down by the induction-pipe fitting, F^1, seen in Fig. 6. The head of the exhaust-valve is made of cast-iron, and this is fixed to the steel valve-spindle, D^4. The valve is normally held on its seat by the flat leaf-spring, D^5, instead of by a helical spring, the spring, D^5, being at its other end fixed to the casting, B, as seen. The ignition-plug is provided for in the cylinder-head at D^3; it lies in a horizontal position.

The exhaust-valve is operated by a cam, C^1, which is carried by the cam-shaft, C, and this shaft lies immediately beneath the crank-shaft, where it is provided with bearings—having solid bushes—in either side of the crank-chamber casting. The cam, C^1, is made from a drop forging, in one piece with the large spur-wheel, C,^{2} by which it is driven at half speed from the spur-wheel, B^6, on the crank-shaft. The cam, C^1, engages with a steel roller, C^5, on the lever, C^4, and this lever, which at its other end acts direct upon the valve-spindle, D^4, is so pivoted at B^5, in the casting, B, that the oil cannot find its way out from the crank-chamber along it. The forward end of the lever, C^4, is fitted with an adjustable set screw, by which the desired amount of free play between the lever and the valve-spindle can be

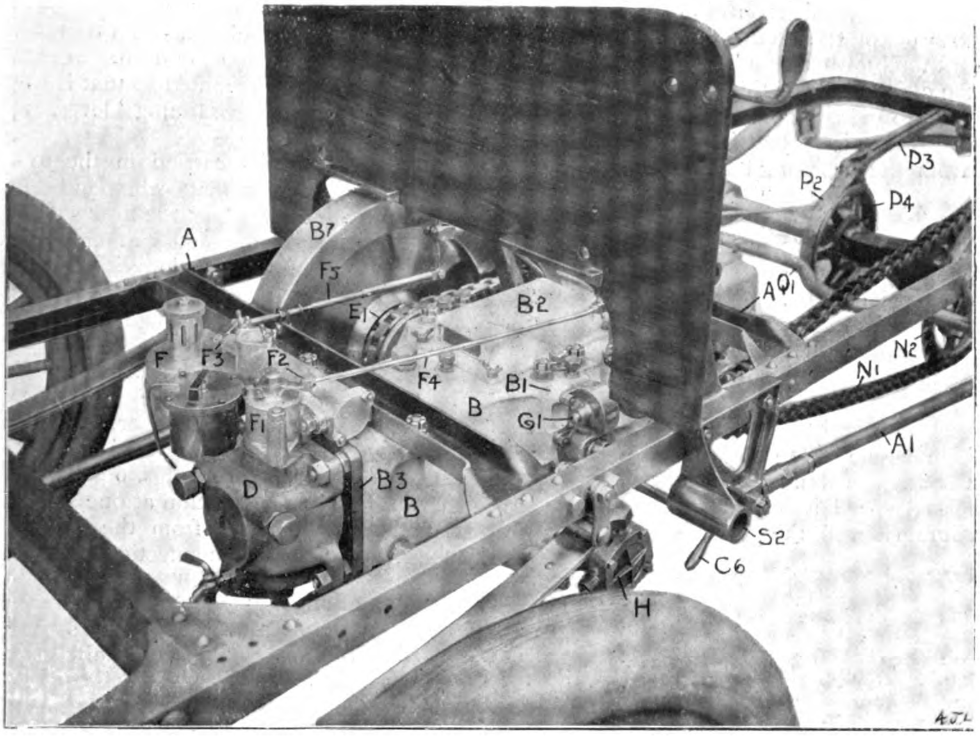


FIG. 6.—View of the 6-h.p. Wolseley Engine, in place, from the front of the Dash.

obtained. It will be noticed that the cam-shaft, C, is also fitted with a sliding member, C^3, this being an additional cam which can be made to engage with the roller, C^5, so as to reduce the compression at starting — by lifting the exhaust-valve during the early portion of the compression strokes of the piston, D^6. The position of the cam, C^3, is controlled by a sliding spindle, C^6, which passes through a stuffing box in the side of the crank-chamber and terminates in a handle at the side of the car, conveniently near the starting handle. The rod, C^6, is normally forced inwards by a spring, but, after starting the engine, is drawn outwards and locked in this position. Inside the crank-chamber, the rod, C^6, has the forked lever seen in Fig. 8 attached to it, the fork engaging in a groove in the cam, C^3. The bearings of the cam-shaft are lubricated automatically, for the oil is picked up by the spur-wheel, C^2, and some of it is caught by the well, C^7, from which it is led by pipes back to the bearings.

The crank-shaft, B^4, is carefully balanced by counterweights fixed to the crank-cheeks. It is of large size, and its main bearings are fed with oil by separate pipes led from the dashboard. At the one end, it is shaped with clutch-teeth to receive the starting handle, and on its other end is mounted the heavy fly-wheel, B^7. This wheel is about $17\frac{1}{2}$ inches in diameter, and has a $2\frac{1}{2}$-inch face, so that the engine runs very steadily, even at a low speed. Between the flywheel and the crank-chamber, is fixed the chain-wheel, which is securely keyed to the hub of the fly-wheel, and from which the power of the engine is transmitted to the change-speed-gear. Near the other end of the crank-shaft, just outside the bearing, is fixed a spiral gear-wheel, B^8, which meshes with a corresponding wheel fitted on the commutator shaft, G^1. These spiral wheels, which are enclosed in a neat oil-tight case, give

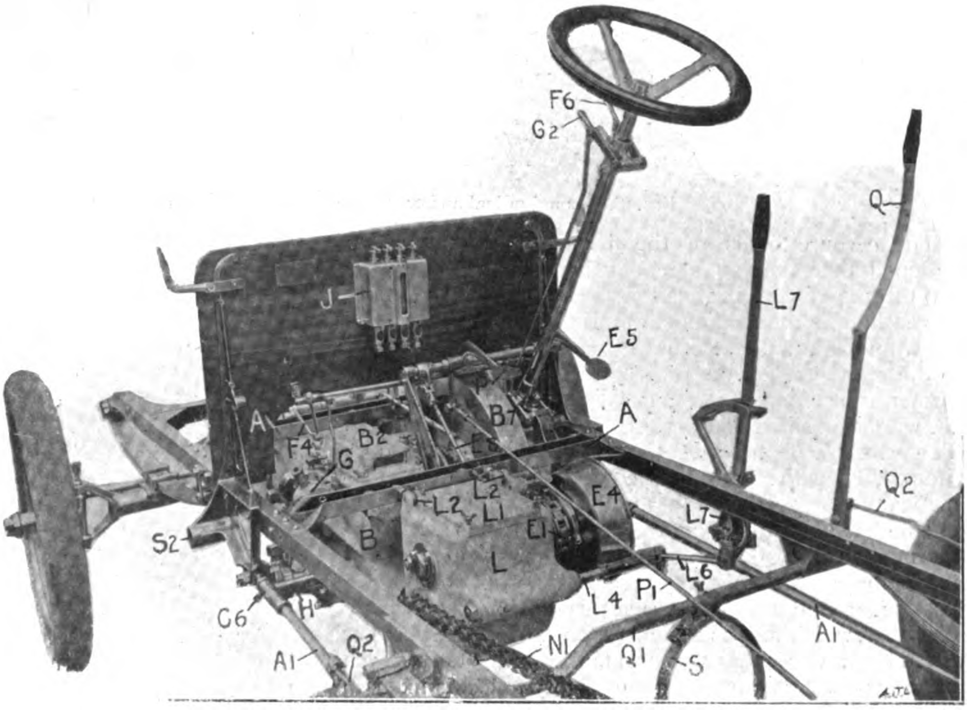


FIG. 7.—The central portion of the Wolseley 6-h.p. Chassis, showing the Engine, the Gear-Box, and the Dashboard.

the necessary two-to-one speed ratio, and allow the commutator, G, to be fixed in a particularly convenient position for inspection. The big-end bearing of the connecting rod on the crank-pin is fed with oil from the inside, a hole being drilled through the crank-shaft for this purpose, and an oil ring, B^{10}, is fixed to the side of one of the crank-checks so as to throw the oil by centrifugal force into it. A special pipe from the dashboard feeds the oil ring, B^{10}.

The piston, D^6, has three rings, and is lubricated by a separate pipe from the dashboard. The piston is so made that it can be machined both inside and outside, as there are no bosses cast in it for receiving the gudgeon-pin. The gudgeon-pin, which receives the small-end of the connecting-rod, is held in place by two forgings, D^7, these forgings passing through the end of the piston and being secured to it by outside nuts.

The cylinder has a bore of 4½ ins., and the stroke is 5 ins. The normal speed of the engine is 800 revs. per min., but it is designed to run at any speed up to about 1,000 revs. per min. At normal speed it develops a little over 6-b.h.p., and at maximum speed the power is proportionately greater.

The carburettor is of the float-feed spray type, so designed that the jet is readily accessible. There are two throttle-valves arranged between it and the inlet-valve, the one immediately around the inlet-valve, inside the fitting, F^1, and the other in the induction-pipe near to the spray-jet. The projecting lever-arm, F^2, of the former is seen in Fig. 6; it is connected by the rod, F^4, with the small hand-lever, F^6, on the steering-pillar. The arm, F^3, of the other throttle-valve is connected by the rod, F^5, with the brake-pedal, P, so that it is automatically closed when the foot-brake is applied. The engine has no automatic governor, and its speed is primarily controlled by the lever, F^6. There is no provision made for admitting auxiliary air, the whole of the air passing around the jet; the air is drawn from a large chamber, which acts as a silencer for it. The carburettor is fed by gravity from the petrol tank, and the tank, which has a capacity for running about eighty miles, is fixed in front of the dash. In our illustrations it has been removed so as not to interrupt the view of the engine, but in Fig. 6 the position which it has assumed is evidenced by the narrow brackets and the marks on the woodwork. The commutator, G, is used in conjunction with accumulators, which lie beneath the seat, and a trembler coil, which is fitted in a neat case on the dash. It is of the "wipe" contact type and is mounted so that it can be rocked about its shaft, G^1, by the "timing" lever, G^2, on the steering pillar.

The starting handle is normally carried in the tool box. It engages with the crank-shaft when inserted through a socket, S^2, provided for it on the near side of the car. When starting, the compression can either be relieved by means of the handle, C^6, alongside it, or, alternatively, the inlet-valve can be held off its seat by depressing a small plunger, which fits through the top of the induction-pipe and throttle fitting, F^1.

The circulating-pump, H, is fitted with its spindle, H^1, in line with the cam-shaft, and is itself fixed to a bracket that is bolted to the crank-chamber, B. The spindle, H^1, and the cam-shaft, C, engage with one another, and the pump lies, as seen in Figs. 6 and 7, in a very convenient position for inspection at one side of the chassis. It circulates the water from the radiator through the jackets, and the pipe connections are all short and very direct. The radiator is of the Wolseley well-known type, and forms the sides and front of the bonnet, as seen in Fig. 1. The finned pipes are fixed into aluminium headers at each end, and these are fitted with internal partitions to direct the flow of the water through the tubes in series. Both headers are provided with filler caps at the top, and they are cast in one piece with one another. The radiator has sufficient capacity—and the cooling tubes are sufficiently effective—to enable the car to travel a considerable distance without refilling, and, in ordinary practice, it is only necessary to add sufficient water occasionally to make up for such small leakage as may occur.

(To be continued.)

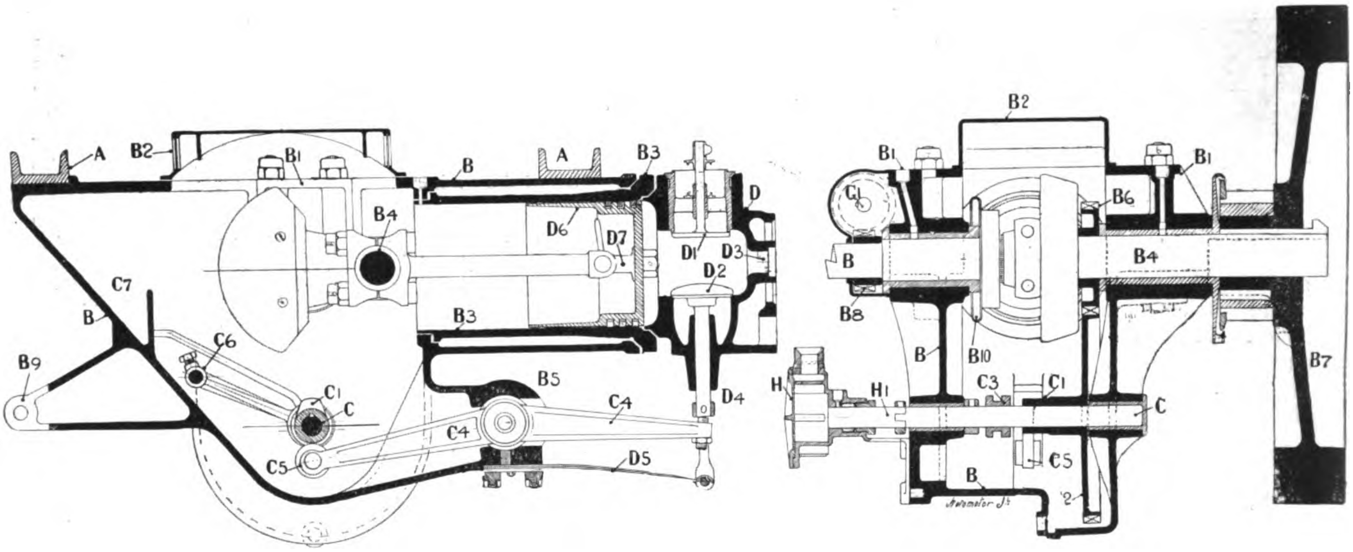


Fig. 8.—Longitudinal and transverse sections of the Wolseley 6-h.p. Engine.

At the recent meeting of the Cycle Engineers' Institute, when it was formally determined to alter the title to the Automobile and Cycle Engineers' Institute, Mr. H. Austin, of the Wolseley Tool and Motor Car Company, Limited, was appointed president in the place of Mr. A. S. Hill, who retires from the position.

THE HUTTON PETROL CAR.

(*Continued.*)

The Barber Gradually-Variable Speed-Gear.—Part II.

COMING next to the clutch-rings, the arrangement of which is best seen in Fig. 22, it will be noted that there is a casting, J, at each end of the gear-mechanism, and that these castings have long central bearings on the shaft, G. On the inner face of each is turned one of the clutch-rings, J^4, these rings projecting inwardly, and being of large diameter. The periphery of the clutch-ring, J^4, is turned smooth and flat, whilst the inner face has V-grooves formed in it. One set of clutch-shoes, L^2, rides on the external smooth surface, and one set of the internal shoes, L^1, rides on the inner surface, these last-mentioned shoes being similarly grooved so as to secure a large friction surface against the ring.

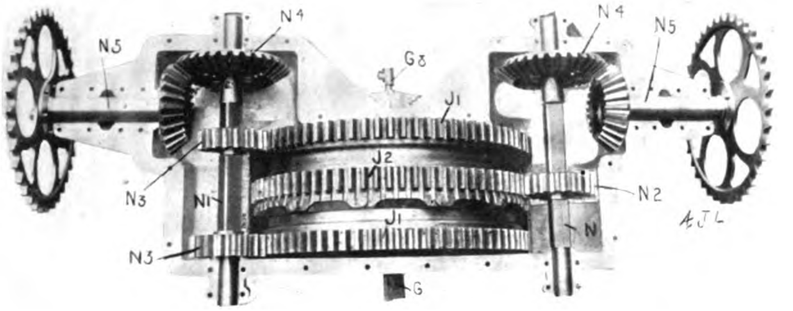


FIG. 26.—View from above of the Barber Gear in its oil-tight casing with the cover removed. Showing Spur-Wheels in position on the Lay-Shafts for giving the "reverse," and the Bevel-Gear connecting them with the Sprocket-Shafts.

Other castings, J^1, lie close inside the castings, J, and are bolted rigidly to them. These castings, J^1, have teeth cut around their peripheries, so that they constitute large spur-wheels from which the power can be taken to gear-wheels on another shaft (N^1, Figs. 26 and 27). The castings, J^1, are of such a shape that they, too, provide clutch-rings, similar in every way to the clutch-rings on the castings, J, except that they project outwardly instead of inwardly. The clutch-shoes, L^1 and L^2, which ride on these clutch-rings are carried by the same toggle levers, L, as those that ride on the facing clutch-rings, and the toggle-levers themselves pass through the space that is left between the clutch-rings. By this construction it will be noticed that each clutch is in balance, so far as tilting or tipping is concerned, for the thrust exerted by the eccentric on the connecting links, K^1, is transmitted to both ends of the pins on the toggle-levers, L, and there are similar clutch-shoes acting upon similar clutch-rings simultaneously, and to the same extent, on both sides of the toggle-levers.

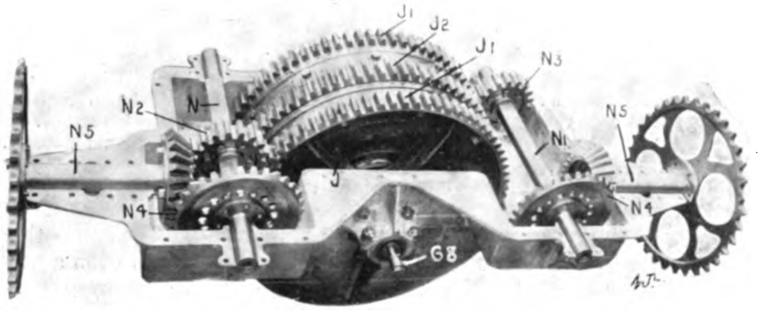


FIG. 27.—Rear view of the Barber Gear fitted in its oil-tight casing, the cover of which has been removed, showing only one Spur-Wheel on each of the Lay-Shafts, instead of two wheels on each, as used in practice.

Between the two castings, J^1, lie other castings, J^2 and J^3, and these are rigidly fixed together in the same manner as each set of castings, J and J^1. The casting, J^2, has spur-wheel teeth formed outside it, and both of them have inwardly projecting clutch-rings, J^4, of the same construction as the other clutch-rings, but somewhat wider. The castings, J^2 and J^3, are free to revolve independently of the shaft, G, and of the castings, J^1, for there is a bearing surface provided between them and the castings, J^1. Their clutch-rings are of larger size than the others in order to obtain the necessarily larger friction surfaces for their clutches, because the clutches which operate on them have to do the same amount of work as the *two* sets of external right-handed clutches together have to do. The right-hand clutches tend to drive the spur-wheels, J^1, in the one direction, and the left-handed clutches tend to drive the spur-wheel, J^2, in the other direction, and normally the same amount of power is transmitted to the parts that rotate right-handedly as to the one clutch-ring that rotates left-handedly—hence also the extra width of the teeth on the wheel, J^2.

Such then is the actual construction of the Barber gear itself, but it will, of course, be understood that this mechanism only forms a part of the transmission gear on the Hutton car, and it will be remembered, too, that on those now being built, a main clutch—although not strictly necessary—is introduced between the engine and the gear: it has been decided to retain the clutch for the present, because most drivers have become thoroughly accustomed to its use, but it is intended to abandon it eventually. The complete gear is fitted in an oil-tight gear-case. In the illustrations the shaft, G, is mounted—on both sides of the change-speed mechanism that we have just described—in bearings formed at each end of the gear-box, and that these bearings fit close up to those of the castings, J, upon the shaft. The gear-box also contains two longitudinal shafts, N and N^1, to which the power is transmitted from the large spur-wheels, J^1 and J^2. The two spur-wheels, J^1, drive one of the shafts, and the spur-wheel, J^2, drives the other, so that the two shafts are caused to revolve in opposite directions to one another. The shafts, N and N^1, are square, and the spur-wheels mounted upon them are free to slide longitudinally, and it is thus that the necessary reversing-gear is obtained. In our illustrations, the wheels on the shafts were not all fitted in place at the time that our photographs were taken, but in Fig. 26 three of the wheels are placed in the positions which they assume when the car is travelling in a "reverse" direction. A second spur-wheel, N^2, is, as a matter of fact, carried on the near-side shaft, N, and the two wheels on this shaft are made to mesh with the large spur-wheels, J^1, at the same time that one of the wheels, N^3, on the shaft, N^1, is slid into engagement with the wheel, J^2, to give the forward travel. In Fig. 27 there is only one spur-wheel shown on each of the lay-shafts, and they are placed in positions which they do not assume in practice in order that the interior of the gear-box may be better seen. Bevel-gearing, N^4, is fitted between both the lay-shafts, and the short transverse shafts, N^5, which—like the differential-countershaft on an ordinary chain-driven car—carry at their outer ends the sprockets from which the chains pass to the rear wheels. It will be noticed that the bevel-wheels, N^4, are arranged in such a manner that although the lay-shafts, N and N^1, revolve in opposite directions, yet the short transverse-shafts, N^5—and therefore the road-wheels—are caused to revolve in the same direction as one another. All the moving parts, being enclosed in the gear-box, are completely protected from dust and are thoroughly lubricated.

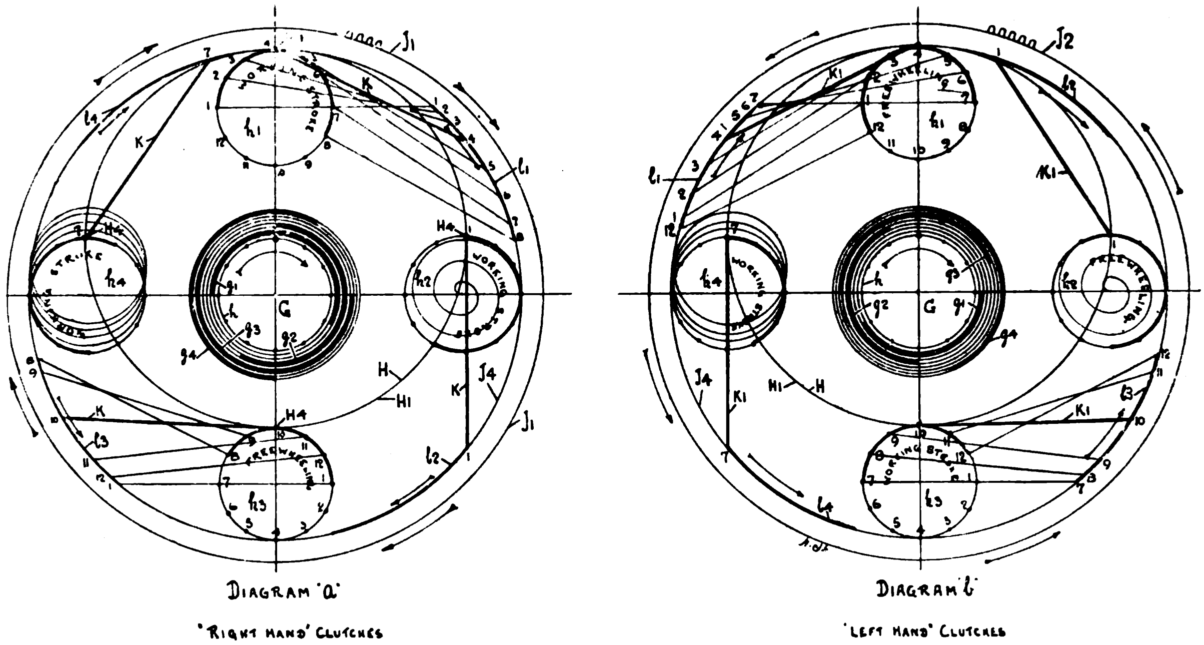


Diagram 'a'

'Right hand' Clutches

Diagram 'b'

'Left hand' Clutches

FIG. 28.—Diagrams illustrating the action of the Barber Gear. Diagram *a* shows the paths traversed by the lugs, H^4, on the eccentric-strap, H^1, by the connecting-links, K, and by the right-hand free-wheel clutches, besides indicating the relative periods during which each right-hand clutch travels when making its working stroke. Diagram *b* is similar, but deals with the left-hand, instead of the right-hand clutches.

Considering now the manner in which the Barber gear operates, it will be assumed with reference to Figs. 20, 23, 24 and 28, that the shaft, G, revolves in a clockwise direction, that the outer gear-wheels, J^1, also revolve in this same direction, and that the central gear-wheel, J^2, runs counter-clockwise. Fig. 28 has been prepared by us with a view to showing diagrammatically the paths travelled over by the more important parts, and approximately the relative velocities at which they travel. Diagram *a* has reference to the right-handed (outside) clutches, and the corresponding diagram, *b*, refers to the left-hand (central) clutches.

As the shaft, G, revolves, so the sheave, H, of the eccentric also revolves with it, and—unless this is concentric with the shaft—each of the lugs, H^4, upon the strap, H^1, tends to describe a circle, as indicated in our diagrams, *a* and *b*. The radius of the circle described by each of the lugs, H^4, is equal to that of the eccentricity of the eccentric-sheave, at the time; in our diagrams, the paths, h^1, h^2, h^3 and h^4, represent the maximum available eccentricity of the sheave, *i.e.*, the diagrams represent the gear in its *top* speed position. This, however, is only the case provided that the strap, H^1, does not revolve about the eccentric sheave, H, which, as pointed out in our introductory remarks, it actually does to a certain extent under various conditions. It does so, for instance, progressively, when the car is turning round a corner, and, if then it were the wheels, J^1, that were caused to go faster than the wheel, J^2, the path traversed by the lugs, H^4, would be somewhat as indicated in our diagrams, *a* and *b*, at h^4. The path, too, that they take is not, as a matter of fact, even a true circle, as will be pointed out more clearly presently, owing partly to the cushion action of the hydraulic system operating the gear and partly to the fact that the right- and left-hand clutches do not start their working strokes quite simultaneously. For the moment, however, it will be assumed that the lugs, H^4, do describe true circular paths, and it is upon this basis that our diagrams, *a* and *b*, are made.

When the eccentric sheave, H, is allowed to come concentric with the shaft, G, then it merely runs round idly inside the eccentric strap, H^1, and the lugs, H^4, stand stationary at points which correspond with the centres of what are at other times their circular paths, h^1, h^2, h^3 and h^4. The effect of moving the eccentric gradually so as to increase its eccentricity would be to make the lugs, H^4, describe spiral paths about these four equidistant points, as indicated roughly at h^2, until, at maximum eccentricity, the centres of the lugs, H^4, travel over the circular paths shown in the diagrams, and make a complete circle for each revolution of the mainshaft, G. Each of the lugs, H^4, is connected by links, K and K^1, with right-handed and left-handed free-wheel clutches respectively, so that the idle stroke of the right-hand clutches would, at first sight, be expected to take place simultaneously with the working strokes of the left-hand clutches opposite to them and *vice versâ*. This, however, is not quite the case as will be seen from the diagrams, where the paths of the lugs are shown divided into twelve equal arcs, and the working strokes of the right-hand clutches are seen to be from point 1 to point 8, whilst those of the left-hand clutches are from point 7 to point 12. The working strokes of the right and left-hand clutches, therefore, overlap one another, and what is even more important, are —although of similar length—completed in different durations of time—roughly speaking, in a ratio of seven to five. The times at which the shaft, G, is imparting working strokes to the right- and to the left-hand clutches is very clearly indicated in the diagrams *a* and *b* at g^1, g^2, g^3, and g^4.

The travel of the lugs causes the clutch-shoes, L^1 and L^2, to move backwards and forwards over the clutch-rings, J^4, and the toggle action of the levers, L—assisted by the springs, K^2—makes the shoes grip the clutch-rings when the connecting links, K, are *pushing* them, and makes the shoes ride freely back again over the clutch-rings when the links are *pulling* them. The normal, apparent, paths traversed by the clutch-shoes over the clutch-rings, J^4, are represented at l^1, l^2, l^3, and l^4 in the diagrams *a* and *b*, and the paths, l^1 and l^3, are divided off and numbered to correspond with the working positions indicated by the numbers on the respective paths, h^1 and h^3, of the eccentric-strap lugs, so that from these diagrams the relative time and extent of movement of the clutch-shoes can be seen. The shoes, L^1 and L^2, normally only just clear the friction surfaces of the clutch-rings, when the toggle-levers, L, lie radially to the centre of the shaft, G, so that when the link, K, is pushing the clutch-shoes, they rock round upon their fulcrum pins and grip the clutch-ring between them. Since there are four sets of lugs, H^4, they tend to give four impulses per revolution of the shaft, G, to the clutch-rings, J^4, and since one of the lugs is giving an impulse to its right-hand clutch during the time that the lug opposite to it is giving an impulse to its left-hand clutch, so the eccentric-strap, H^1, is placed practically in equilibrium so far as its own rotation about the eccentric is concerned. The eccentric-strap is, therefore, "floating," and it is immaterial whether it is causing the brake-ring castings, J^1 and J^2, to revolve at the same speed as one another in opposite directions or not, so long as the speed of the two added together remains the same. Thus, if the castings, J^1, were held stationary, the casting, J^2, would run round left-handedly at twice its normal speed, and if it were held instead, then the castings, J^1, would revolve right-handedly at double speed; the eccentric-strap at these times would revolve about the eccentric-sheave at half the speed, and in the same direction as, the driven member. It is this feature of the gear that gives a differential action to the car, and renders unnecessary any ordinary differential gear.

(*To be continued.*)

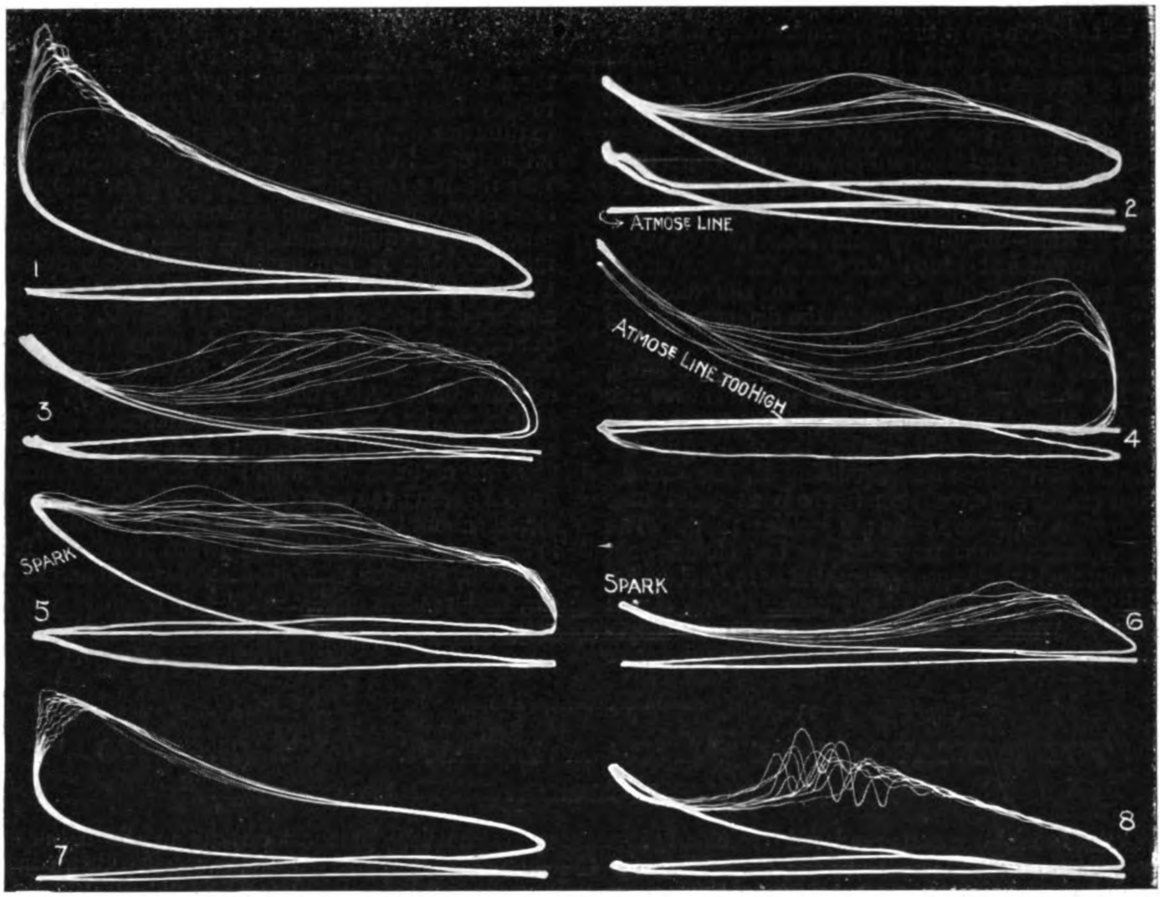
THE INDICATOR DIAGRAM OF A HIGH-SPEED PETROL MOTOR.*

By Prof. H. L. Callendar. M.A., F.R.S.

This important Paper was rendered particularly interesting by the very practical manner in which the subject was brought before the members of the club, Professor Callendar having an actual motor fitted with an indicator running and arranged in such a way that the diagrams were shown on a large scale upon a screen. The Paper itself, which was taken as read, is given in full below, and will be found to contain in a concise form the majority of the special points which were brought out with great lucidity during the course of the evening. The motor upon which the indicator was fitted was attached to a bicycle, and the bicycle was fixed in such a way that a powerful brake could be applied to the back wheel, or that it could be allowed to run freely. The form of indicator employed—the Hospitalier Carpentier—was that described by us on January 10th of last year, but although comparatively little was said about it by Professor Callendar, yet it was of a very much improved form, and had been brought up to this remarkably high state of perfection by himself. As originally made, the Hospitalier instrument, ingenious though it is, was by no means accurate when used in conjunction with small engines running at very high speeds, and even after undergoing considerable improvement by the inventor, the diagrams obtained with it were still, to a great extent, distorted.

With Professor Callendar's instrument, however, very accurate results are obtained, and he has been able to eliminate to a remarkable extent the difficulties that give rise to distorted diagrams. With this form of indicator the actual diagram itself is obtained by causing a small mirror to throw a beam of light upon the screen, and by arranging the mirror in such a way that its movements are controlled in two directions—firstly, by the degree of pressure in the cylinder, and, secondly, in a direction at right angles to the other direction, in accordance with the backwards and forwards motion of the piston. The beam of light is thrown up and down in accordance with the pressure, and backwards and forwards (sideways) in unison with the to and fro movement of the piston, thus causing it to describe curves, which are made in so short a space of time that the complete diagram is visible. Professor Callendar's chief improvements consist in introducing a short tube, instead of a long one, between the combustion chamber and the diaphragm upon which the pressure acts, and in substituting positive bevel gearing for the flexible drive previously used for transmitting the motion of the piston to the mirror. Even with the short tube, however, he at first experienced difficulty through resonance in the tube, and it was not until he inserted sheets of gauze, placed at intervals across the tube, that he was able to obtain a thoroughly satisfactory result. Some of the sample diagrams, which we reproduce, show very clearly the effect of the short tube as against the long tube, and of the gauze in damping resonances. We would also draw special attention in other of these diagrams to the records which are clearly visible upon them, of the moment at which the ignition spark occurred during the cycle. Professor Callendar, during the evening, varied the conditions under which the engine was running in almost every conceivable way, and was, therefore, able to show graphically the actual effects which each of such variations had upon the action

of the engine. The sample diagrams which we give are each accompanied by brief explanations as to the conditions under which they were obtained, and these, taken in conjunction with this very valuable paper, will enable the importance of Professor Callendar's subject, and the significance of the improvements that he has made in the instrument, to be fully realised.



Some characteristic Diagrams taken by Prof. Callendar from a Clement-Garrard Cycle Motor.

No. 1.—Full load diagram taken with short tube between engine and indicator, but with one gauze only to damp explosive resonance. Speed of engine 2,030. B.h.p. 1·18 on road wheel. I.h.p. 2·37 gross Max. press. 230 lbs. per sq. in. Mean press. 78 lbs. Temp. 200° C. Spark full advanced. Throttle full open. Inlet-valve spring tension 7.

No. 3.—Two superimposed diagrams showing the small reduction of power caused by silencer, the one diagram with free exhaust, and the other with silencer half throttled. The temperature in the first place was 180° C, and in the second 200° C. Speed 1,500 revs. per min.

No. 5.—Diagram showing effect of very strong inlet-valve spring. Weak mixture. Throttle half open. Ignition full advanced. Spark indicated. Speed 2,430 revs. per min. No load. Mean press. 31 lbs. per sq. in. I.h.p. 1·15.

No. 7.—Diagram showing effect of long copper tube between indicator and engine, in reducing pressures with 25 per cent. residual distortion. Pressure retardation compensated. Throttle full open. Ignition full advanced. Speed 2,000 revs. per min. Mean press. 61 lbs. per sq. in. I.h.p. 1·84. Max. press. 160 instead of 230 lbs. per sq. in.

No. 2.—Diagram showing the effect of reducing the lift of the exhaust valve to 1 mm. Showing excessive back pressure. Engine running without load, and with difficulty at 1,500 revs. per min. Timing at centre of range, throttle ¾ open.

No. 4.—Diagram showing the effect of very weak inlet-valve spring in occasional loss of compression. Throttle-valve full open, spark retarded, speed 1,850 revs. per min. Mean press. 59 to 67 lbs. per sq. in. (unsteady).

No. 6.—Diagram showing latest period of explosion and moment of full retarded ignition. No load. Throttle nearly closed. Speed 1,930 revs. per min. Mean press. 20 lbs. per sq. in. I.h.p. 0·58.

No. 8.—Diagram showing effect of leakage in indicator, and the vibrations due to explosive resonance. Indicator tube has 1/16-inch hole in it. Throttle half open. Spark, midway between full retard and mean position. Rich mixture. Speed 1,500 revs. per min.

THE object of this paper is to describe the method adopted for obtaining high-speed indicator diagrams, and to show how the indicator may be utilised in the study of the theory of the motor, and as a guide to its practical improvement. The paper will be illustrated by lantern slides of typical diagrams illustrating the working of the motor under various conditions, and elucidating the nature of some of the defects which occur in practice. The motor itself will be exhibited in action with the indicator attached, and the actual diagrams will be projected on the screen showing the changes of form as they occur when the conditions of running are changed.

Engine.—The motor employed in these experiments is a Clement-Garrard cycle motor, with 60 mm. bore, and 70 mm. stroke. The cylinder capacity is 198 c.c., and the clearance volume approximately 60 c.c. The valves are on the top of the cylinder, and a fan is arranged on the flywheel to deliver a blast on the exhaust-valve side, which is necessary to prevent the valve being injured when the engine is run continuously for a long time on the stand. The inlet-valve is automatic, and is provided with an arrangement for varying the tension of the spring for experimental purposes while the engine is running.

Manograph.—The indicator used is a Hospitalier-Carpentier manograph, with certain modifications which are necessary for high-speed work. It is connected directly to the cylinder by a short steel tube, 5 mm. bore, in place of the long fine copper tube usually employed. The pressure acts on a thin steel disc, the movements of which are communicated to a large pivoted mirror, which is tilted upwards through an angle proportional to the pressure acting on the disc. The movement of the mirror is observed or recorded by a ray of light reflected on to a screen or photographic plate. In order to record the pressure at each point of the stroke in the form of a continuous curve or diagram, the mirror is simultaneously tilted from side to side by a little crank revolving in time with the flywheel, so that the spot of light reflected from the mirror moves horizontally in time with the motion of the piston in the cylinder. Owing to the high speed, the spot of light is seen as a continuous curve, which is readily measured or photographed.

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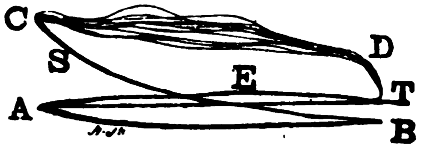
* A Paper read before the members of the Auto-Cycle Club, at the Royal College of Science, South Kensington, on May 4th.



Revs. 2430. Light.

Sample Diagram.—The relation of the indicator diagram to the cycle of operations taking place in the cylinder of the motor will be readily understood by reference to a sample diagram. The straight horizontal line, A T, which the spot of light describes when the pressure is atmospheric on both sides of the steel disc of the indicator, is called the atmospheric line. When the piston is at the top of the exhaust stroke, the spot of light is at A, and the pressure in the cylinder is practically atmospheric. As the piston moves outwards on the suction stroke, the spot of light describes the line A B. This falls considerably below the atmospheric line at high speeds, showing a negative or suction pressure (required to draw the charge into the cylinder) of more than half an atmosphere. At B the piston turns, and begins to compress the charge. As the charge is compressed the pressure rises, as shown by the curve, B C, reaching a maximum (in this case of 47 lb. per square inch) at C, when the piston has again reached the top of its stroke. Shortly before this, at the point S, the spark occurs in the cylinder, and fires the charge. The spark itself can be photographed on the plate by using a spark gap in the focus of the mirror. Although the explosion pressure takes less than a hundredth of a second to develop, even with a very weak mixture, as in this diagram, the piston has already reached the middle of its outward stroke. at the high speed of 2,400 revolutions per minute, before the combustion is complete. The pressure is never quite the same in successive explosions at this speed, so that the explosion lines do not exactly coincide. The exposure of the photograph in this case lasted three-quarters of a second, and includes fifteen successive explosions. At the point D on the diagram, the exhaust-valve opens near the end of the stroke, and the pressure in the cylinder rapidly falls to the atmospheric, before the piston has had time to turn. During the exhaust stroke, from T back to A, the piston is pushing the remainder of the exhaust gases out of the cylinder, and the pressure in consequence rises a little above the atmospheric line at E.

Indicated horse-power.—The work done by the motor depends on the average excess of pressure in the explosion stroke, C D, over that in the compression stroke, C B. This is called the mean effective pressure, and when multiplied by the area of the piston and by the length of stroke (*i.e.*, by the cylinder capacity) gives the gross work done per explosion. This is reduced to foot-pounds, multiplied by the number of explosions per minute, and divided by 33,000 to get the gross indicated horse-power. The work done by the piston against back-pressure and suction during the pumping strokes, T E A and A B, may be also ascertained from the diagram, and deducted so as to obtain the net indicated power; but it is in some respects more convenient to include these necessary losses with mechanical losses such as piston and bearing friction.

The diagram above illustrated was taken with the engine running light on the stand, the gas supply being throttled by reducing the lift of the inlet-valve, so that the explosion pressure was comparatively weak. As the throttle is opened, and the engine is made to do work on the brake, the explosion pressure is much greater, the pressure rises steeply at C, and the area of the diagram, which is proportional to the work done per explosion, is greatly increased. On the other hand, if the spark is retarded so as not to take place till after the piston has turned the corner at C, the pressure does not begin to rise till late in the stroke, and the engine runs comparatively slowly. The changes in the form of the diagram with variations of spark advance and load will be illustrated on the screen.

Brake horse-power.—The nominal brake horse-power of a motor is generally estimated from the cylinder capacity and speed, or measured by a brake acting on the flywheel. Given a complete motor cycle, with the engine already fitted in position, it is more convenient and satisfactory to measure the brake horse-power by applying a brake to the tyre of the road wheel. This is easily done if the brake is cooled by water circulation, and the tyre lubricated with glycerine. The brake horse-power so determined includes transmission losses in the belt or chains and bearings, and gives the power actually available for propelling the machine.

Defects of the Indicator.—In order that the information given by the indicator should be of value, it is necessary that it should indicate correctly the pressure actually existing in the cylinder at each point of the stroke. If the connection between the cylinder and the indicator is throttled by using a long fine tube, the explosion pressure shown by the disc may be much less than that in the engine, and the maximum indicated pressure will be much later. The retardation of the pressure may be corrected, as in Mr. Hospitalier's method, by retarding the position of the spot of light relatively to the piston, but the diagram remains distorted, and the indicated pressures are too small. The amount of the retardation changes also with the change of speed.

Defects of the Engine.

Overheating.—The principal defect of the air-cooled motor is that, if it is run at full power continuously, the cylinder rapidly becomes too hot for efficient lubrication, the motor loses power from excessive friction, and refuses to go when power is most wanted, as in hill-climbing on a low gear. To run such a motor at full power it is necessary to employ artificial methods of cooling. For moderate sizes air cooling by a fan is preferable to water cooling, as it is much lighter and less likely to cause trouble. Another reason of the falling off in power when the cylinder is very hot is that the incoming charge is heated and expands, so that less mixture is drawn into the cylinder. The compression pressure is also higher, owing to the gas receiving heat from the hot walls of the cylinder during the compression stroke. This is well shown by comparing two diagrams taken under similar conditions with the cylinder cold in one case, but hot in the other. The hot cylinder shows the higher compression pressure and the smaller explosion pressure, so that the power is diminished for both reasons.

Ignition.—The commonest of all defects is imperfect or variable ignition from a weak spark or a dirty plug. This is shown especially at high speeds by sluggish rise of pressure and great irregularity in successive explosions, even if the spark is not so bad as to cause misfires.

Leakage is a fruitful source of loss of power, but is easily detected by testing the compression. A leak shows itself on the indicator diagram as a loop at the end of the compression stroke if the spark is retarded, coupled with a rapid fall of pressure during expansion. The commonest leaks occur at the spark-plug or the exhaust-valve. A leaky plug gets overheated by the hot gases, and soon misfires or cracks. A leaky exhaust-valve gets badly burnt. The effects of leakage are most serious when running slow, as the gas has more time to escape.

Back-pressure, due to insufficient exhaust lift or to a throttled silencer, does not produce very serious loss of power directly unless the throttling is excessive. Indirectly its results are more serious by overheating the engine. The gain of power due to omitting the silencer is generally due mainly to the fact that the rapid escape of the exhaust keeps the engine much cooler.

Errors of timing the Valves rarely occur unless the engine has been taken to pieces and re-assembled with insufficient knowledge. When running slow, the exhaust-valve should close slightly before the end of the stroke. The diagram shows that there is, as would be expected, a slight lag in closing at high speeds. It is difficult to get the engine to run at all if the timing is wrong by so much as a tenth of a revolution; but the corresponding indicator diagrams are interesting and instructive as showing the defect in an exaggerated form.

Springs.—The proper adjustment of the strength of the valve springs is a matter which generally receives careful attention at the hands of the makers. Troubles are often occasioned by the springs becoming weakened by overheating or otherwise. If the exhaust spring is too weak to keep the valve closed against the suction, burnt gases are drawn back, and the charge is weakened. This is especially liable to occur with a stiff inlet spring, and makes the engine weak at high speeds. The defect is readily detected by the indicator by holding up the inlet-valve so that it cannot open, and driving the engine by pedalling or otherwise. The exhaust spring should be strong enough to hold the valve closed against the atmospheric pressure. A useful auxiliary method of governing or regulating the speed is to employ a spring exhaust lifter, the effect of which is not actually to open the exhaust-valve, but to diminish the effective strength of the spring. This does not heat the cylinder like throttling the exhaust, but weakens the mixture by suction leakage.

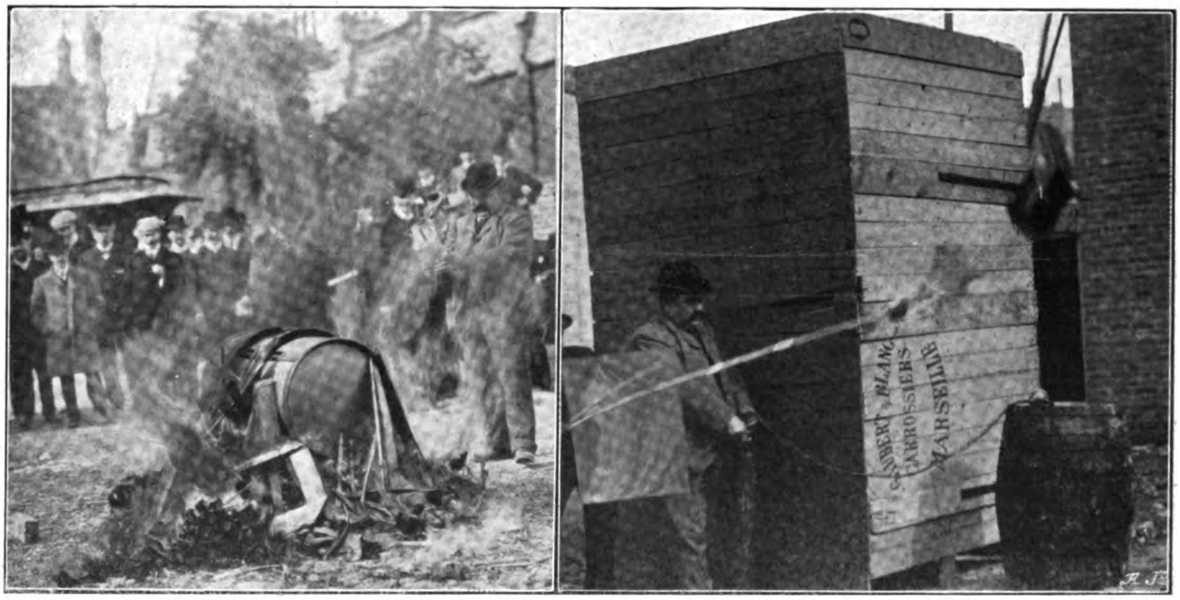
With an automatic inlet-valve the strength of the spring is a most important consideration. If the spring is very weak, the suction pressure is diminished, and a larger charge is drawn into the cylinder, giving more power at low speeds, which is useful for hill-climbing. But at high speeds a weak spring does not close sufficiently quickly and steadily to retain the charge, and the diagrams show unsteadiness and loss of compression. A stiff spring is suitable for high speeds, but it throttles the gas too much for hill climbing. The only satisfactory solution is to fit an arrangement for varying the tension of the spring, which may easily be designed to serve also in place of a throttle valve.

Speaking generally, the diagrams indicate that loss of power at high speed is due rather to diminished charge than to back pressure. A good deal of the suction loss is due to the carburetter, and could not be cured by fitting a mechanical inlet-valve. Some suction loss is probably necessary to secure a good mixture at high speeds, as the time of mixing is so short; but any devices for getting more mixture into the cylinder would evidently be futile, unless at the same time effective provision were made for cooling the cylinder. In any case, the thermal or fuel efficiency would be lowered owing to the higher explosion temperature.

THE "NONEX" SAFETY DEVICE.

A new, and altogether very useful, application of an old idea—the Davy lamp—has been introduced into this country by the Non-Explosive Device Company, Ltd., for rendering secure from explosion all receptacles intended to contain inflammable spirit—such as petrol. In brief, the orifices of the vessels so protected form the upper ends of tubes which project down inside to the bottom of the vessels. These tubes, which are closed at the bottom ends, are perforated in each of the layers of which they are composed in such a way as to successfully apply the Davy lamp principle to the altered circumstances. That is to say, the tubes, while allowing the spirit to percolate quickly to or from the interior of the tanks, prevent the passage of burning gas, by absorbing its heat, in the same way that the wire gauze does in a Davy lamp, although it may be remarked, in passing, that wire gauze is not used in the "Nonex" device because it was found to be unreliable and unsatisfactory for this purpose. That the "Nonex" device is satisfactory was practically demonstrated at the Cadogan Garage, Chelsea, on Thursday in last week, where, among other striking experiments, a 20-gallon tank was partly filled with petrol and placed on a lighted bonfire. In a short time the safety plug (with which the screw caps forming part of the "Nonex" device are filled) blew out, and the ascending petrol vapour immediately caught fire. After extinguishing the external fire with water, the vapour flame was very easily stamped out with a bundle of rags, and then the flame was kindled and extinguished again several times in succession.

By way of pointing out the danger of setting fire to unprotected cans, a comparative test was made by passing a stream of hydrogen gas through protected and unprotected petrol cans. Whereas in the protected can the issuing gas was safely ignited and burnt steadily, the unprotected can immediately exploded with a loud report. So effective is the "Nonex" safety device that it is apparently quite safe to transfer such inflammable liquids as petrol from one vessel to another, and to set fire to the petrol as it issues from the one vessel or enters the other. Our photographs give a good idea of the drastic nature of the tests that were made. We would call special attention to the illustration in which the ordinary petrol can is seen ascending in the air immediately after the explosion had occurred, for, apart from the interest that is naturally attached to it, it is curious as a photograph; the explosion was so violent, and was so unexpected to our photographer, that it startled him, and he took the picture unintentionally.



Experiments with the "Nonex" Safety Device.

Boiling the petrol and feeding the flames from a "protected" Can. The fate of the unprotected Can (seen in the air).

An opportunity to appreciate the elephantine movements and possibilities of the Pedrail is afforded at the Polytechnic, Regent Street. Mr. Diplock's No. 2 vehicle is now being exhibited at this institution, by means of the cinematograph, daily. It is seen hauling a train of wagons, turning quickly in a circle, and climbing over a small staircase. This item forms part of "Our Navy," a lecture which, at present, is given daily. Four o'clock is about the time when the scenes of the Pedrail are shown.

CORRESPONDENCE.

⁂ *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for insertion, or containing queries.*

THE AUTOMOBILE CLUB AND INCONSIDERATE DRIVING.

119, PICCADILLY, LONDON, W.
May 4th, 1904.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR.—The Committee of the Automobile Club have recently decided on measures in the carrying out of which they desire the co-operation of the public, and consequently beg permission to approach your readers through the columns of your paper.

The Committee are appealing to all drivers of motor vehicles to drive with consideration for other users of the highway, and are urging members of the Automobile Club—which is a Society of Encouragement of the motor movement—to set an example by so driving their automobiles as to inconvenience as little as possible the public generally.

The Committee of the Club feel sure that the members of the club generally do not desire that any automobilist who may persist in driving his motor vehicle inconsiderately should be, or remain, a member of the club.

They therefore wish it to be understood that the Committee of the Club are resolutely setting their face against motor cars being driven, not only at high speeds to the danger of the public, but also to the annoyance of other users of the highways of the United Kingdom, and deprecate the use thereon of cars intended to be driven at excessive speeds.

The Committee also realise that motor vehicles of low power are at times driven very improperly.

The public are provided by the Legislature with effective measures for bringing to justice drivers of motor vehicles which are driven at excessive speeds, or to the danger of the public, and it is therefore not necessary for the Club to invite the co-operation of the public in connection with these punishable offences.

The Committee, however, invite the public to draw attention (by letter addressed to the Club Secretary, Automobile Club, 119, Piccadilly, London, W.) to flagrant offences by motor drivers against the laws of etiquette and good feeling which are well understood and generally observed by all classes of road users, and to such conduct as may, by causing unnecessary vexation and inconvenience to the public, prejudice the best interests of automobilism in this kingdom. Among the offences which may be included under the heading of inconsiderate driving the following instances may be given:—

(*a*) The driving of a motor vehicle in overtaking or passing other vehicles, cyclists, or pedestrians at such an immoderate speed as to cause unnecessary inconvenience or vexation by dust or mud.

(*b*) The overtaking and passing of another motor vehicle when the latter is proceeding cautiously down hill, or is approaching a corner, traffic, &c.

(*c*) The passing of another vehicle so as to drive it or others off the road, or cause them unnecessary inconvenience.

If the offender be a member of the Automobile Club he will be dealt with under the following rule:—

63.—In the event of a grave breach, by a member, of the rules and regulations of the Club, or of conduct on the part of a member rendering it desirable that he should cease to be a member, a meeting of the Club Committee shall be convened, at which such member shall be invited to attend, to inquire whether a cause of expulsion has arisen or not. In the event of any member being, in the opinion of the Committee, guilty of reckless driving under circumstances involving conduct which the Committee may consider unsportsmanlike, or ungentlemanly, or prejudicial to the interests of automobilism, he shall be called before the Committee, and, failing a satisfactory explanation, he may be cautioned or suspended, or required to resign his membership, &c., &c.

If the offender be not a member of the Automobile Club of Great Britain and Ireland, but be a member of an affiliated club, the complaint will be passed on to the committee of that club.

If the offender be not a member of an automobile club the complainant will be so informed, in order that he may take such action as he may consider to be advisable.

It is hoped that no complaint will be made unless the offence is clear, as in the event of the offence being denied it will be necessary to ask the complainant to substantiate his complaint before the case can be dealt with.

Further, the committee trust that you, sir, will permit this opportunity to be taken to inform the public that they have appointed special committees to study the following important questions:—

(1) The points in the design of motor cars which tend towards the raising of dust, and features of construction which tend to lessen this inconvenience.

(2) To watch experiments which are being made under the auspices of public bodies and the Press, with preparations which it is claimed when applied to a road surface secure dustlessness, in order that full information as to the cost and effectiveness of the systems may be at the disposal of road authorities; and

(3) The proposed inauguration by the Club of a new form of competition which may turn the attention of constructors towards increased efficiency in the ordinary touring and commercial motor cars, rather than to the creation of special machines in which everything is sacrificed to speed.

The committee request me to convey to you, in anticipation, their thanks for your courtesy in publishing this communication, which is written by their desire and on their behalf.

I am, sir, your obedient servant,
H. C. L. HOLDEN,
Chairman of the Club Committee.

CLINCHER-MICHELIN TYRES.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—We read in your last issue of the 7th inst., to the page 550, that it is well known that the North British Rubber Company are the great licensed manufacturers of the Michelin tyres in England.

Allow us to make you know that this information is not exact.

The "Clincher-Michelin" tyres sold in your country by the foresaid firm are manufactured by us, as you can see on the trade mark of these tyres, which read as follows:—

"The Clincher-Michelin Tyre, Bartlett Patent, *manufactured for* "The North British Rubber Company, Limited, *by* Michelin and Cie Clermont-Ferrand."

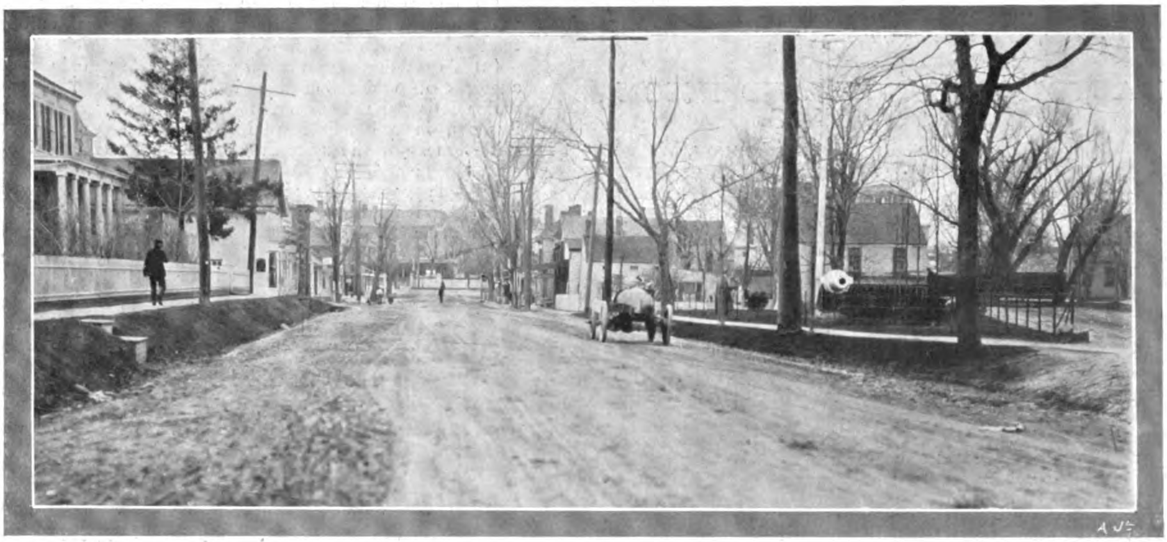
Yours truly,
MICHELIN & Co.

Clermont-Ferrand, France, May 7th.

A FURTHER illustration of the value both of the automobile and the motor cycle, and of the extent to which the latter machine is finding a footing in the Army, was afforded on the occasion of the private visit paid by His Majesty to Aldershot on Monday last. Quite unexpectedly and without allowing any intimation of his intention to leak out, the King, accompanied by the Duke of Connaught, drove up to Waterloo at 20 minutes past 11, and proceeded to Farnborough, where he was met by Sir John French, the Commanding Officer, who was in charge of the operations which His Majesty had decided to witness. Sir John French drove the King in a military motor car to the scene of the manœuvres, a feature of the *cortège* being provided by a novel mounted escort riding motor bicycles decorated with the Royal Standard. The motor cyclist escort proved able to keep well in front of the King's car, and moved about the battle-field at tremendous speed. The operations witnessed included the crossing of the Basingstoke Canal, an unexpected cavalry charge, and artillery demonstration, and concluded with the storming of Cæsar's Camp by the Irish and Grenadier Guards and other regiments. The presence of a military automobile and motor cycles in the neighbourhood of *Cæsar's* Camp gives ample food for reflection.

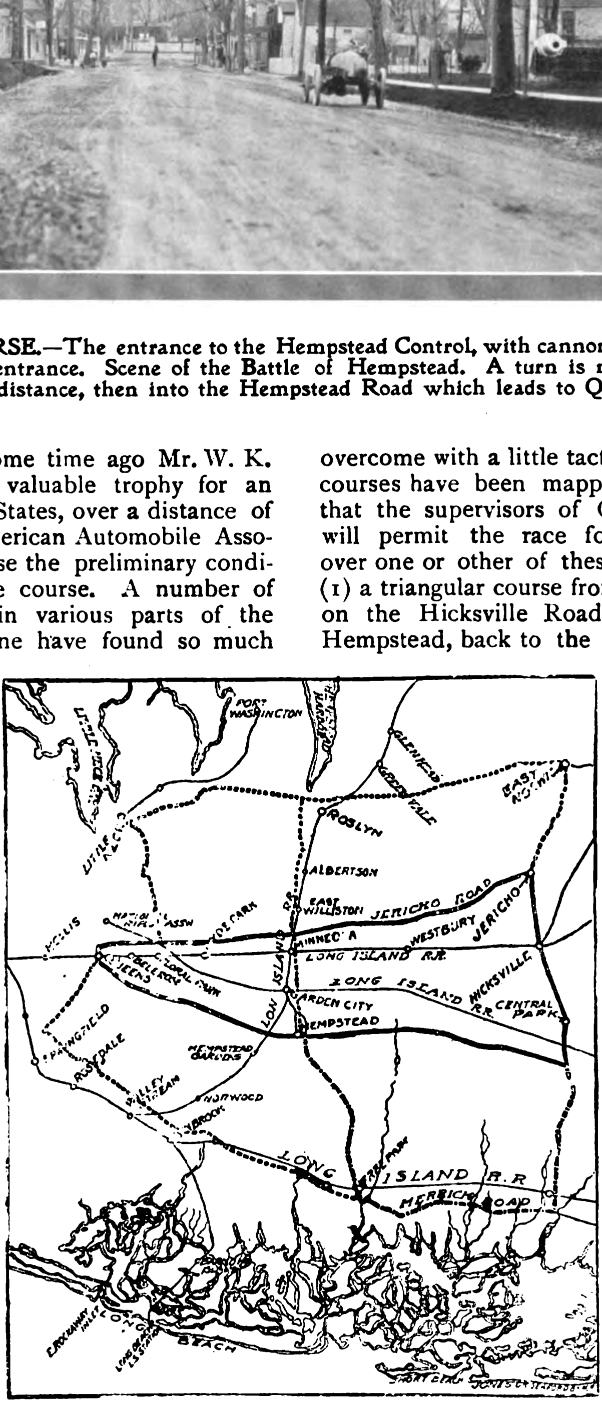
WITH one dissentient, the Richmond Corporation have adopted a resolution asking the Office of Works to limit the speed of motor cars in Richmond Park to ten miles an hour.

VANDERBILT CUP COURSE.

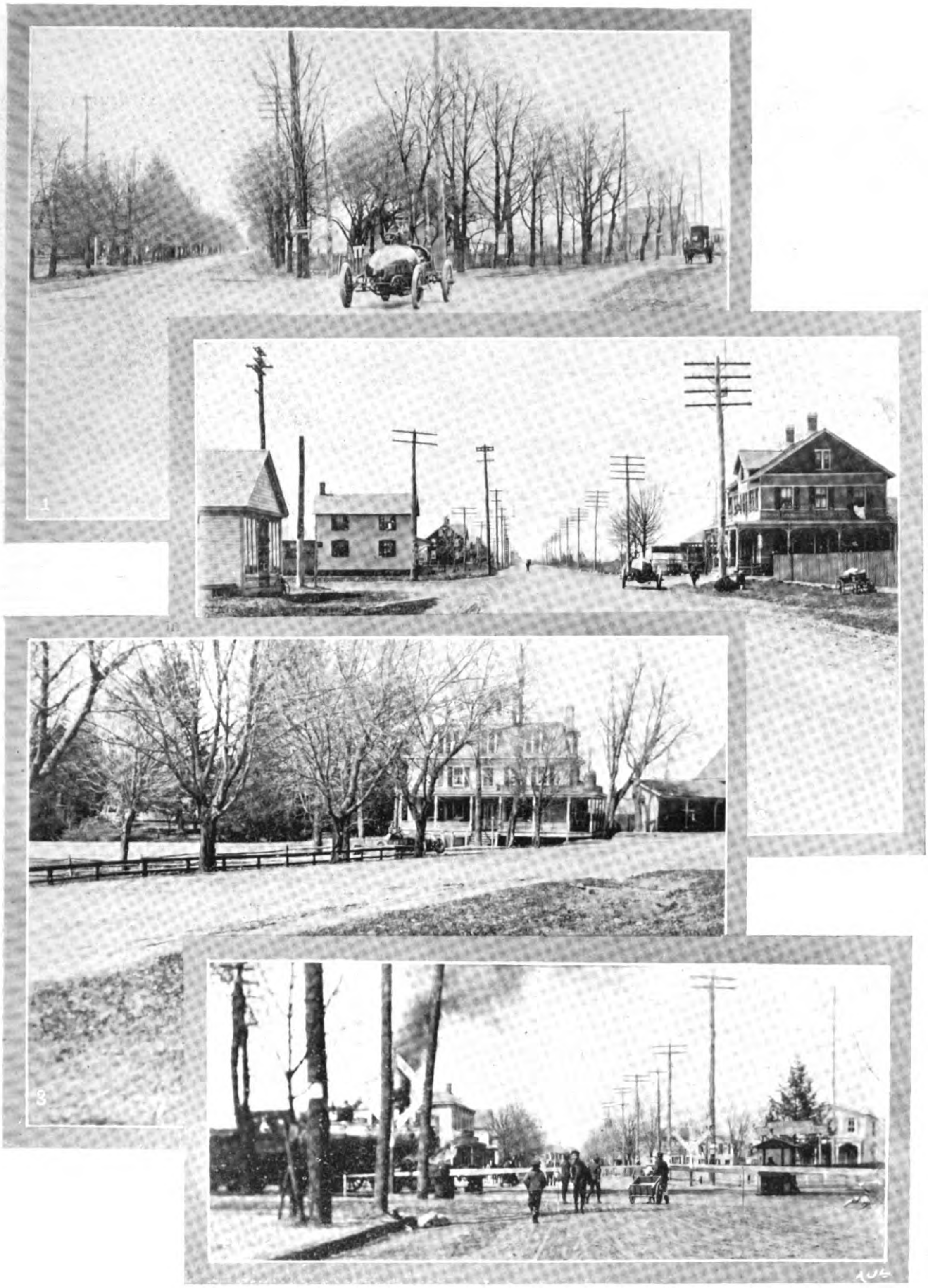


VANDERBILT CUP COURSE.—The entrance to the Hempstead Control, with cannon in honour of Revolutionary War Veterans guarding the entrance. Scene of the Battle of Hempstead. A turn is made at end of this road for a short distance, then into the Hempstead Road which leads to Queen's.

It will be remembered that some time ago Mr. W. K. Vanderbilt, Junior, offered a valuable trophy for an automobile race in the United States, over a distance of from 200 to 300 miles, the American Automobile Association being named to organise the preliminary conditions, and to select a suitable course. A number of routes have been suggested in various parts of the United States, but so far none have found so much favour as the roads on Long Island, as these have the immeasurable advantage of being within a short distance of New York. It was, however, feared that prejudice in this district would interfere with arrangements being made, but a committee of the A.A.A., headed by Mr. A. R. Pardington, the chairman of the Racing Board, members of the Automobile Clubs of America and of Long Island found, upon closer investigation, that this feeling had been grossly exaggerated. To further help matters, the inhabitants were not long in grasping that permission to use a course on the Island would be of considerable monetary value to them, and, as all precautions would be taken against any accident to the public, the organisers soon realised that the difficulties were not so great but that they could be overcome with a little tact and diplomacy. Alternative courses have been mapped out, and it is now hoped that the supervisors of Queen's and Nassau counties will permit the race for this trophy to take place over one or other of these. The routes suggested are (1) a triangular course from Queen's to Jericho, thence on the Hicksville Road beyond Central Park on to Hempstead, back to the starting point, distance about 34 miles; (2) the same course, with a loop from Hempstead to Freeport, thence over the Merrick Turnpike to Massapequa, and then north over the Hicksville Road, distance 41 miles; (3) includes the first two, with a northern loop from Jericho to East Norwich and Roslyn, then south to Jericho Road above Minneola, with a possibility of extending this road as far as Little Neck, and thence south to Floral Park, distance 48 to 50 miles. A still more extended course is mapped out from Queen's to Merrick Pike, near Springfield, thence to Massapequa. As this route takes in several more villages, however, it is not regarded favourably, and the second course, with the Freeport loop, is the one so far considered best. We reproduce some interesting photographs of points on this road, and the accompanying



Map showing the suggested Courses.



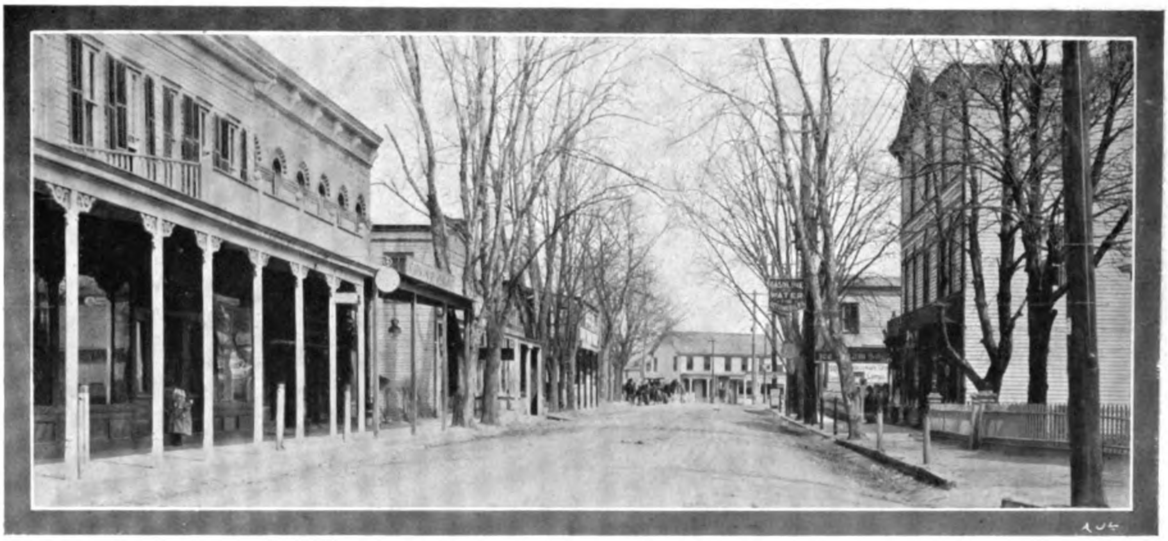
1.—The start and finishing points, Jericho Road to left, about 12 miles to Hicksville. The Hempstead Road to right, 7 miles from Hempstead.

2.—East Wollaston Hotel, East Wollaston, on Jericho Road, 6 miles from start.

3.—Intersection of the Jericho Road with the Hicksville Pike Road. The turn into the Hicksville Road is a sharp right angle and slightly rising. Joe Tracey is seen on his Peerless Racer just coming round.

4.—Hicksville, the first Control and only bad railroad crossing.

SCENES ON THE PROPOSED VANDERBILT CUP COURSE.



VANDERBILT CUP COURSE.—The town of Freeport, second Control, beyond which the turn to Hempstead is made.

skeleton map gives a good idea of the directions of the roads which are now under consideration.

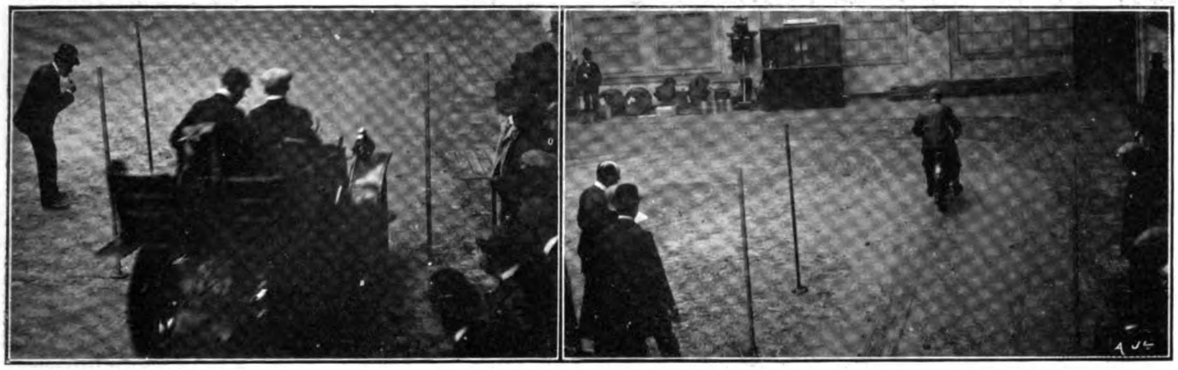
One hundred miles an hour, it is stated, could be made over this course. Joe Tracey, driving the Peerless 1903 Cup racer, has been over the course, and pronounces the entire course ideal. There are no hills, and each roadway is macadam in ideal condition. Starting at Queen's, an hour's run only from the centre of New York, the course extends twelve miles over the Jericho Road, then ten miles over the Hicksville Road, then a little over seven over the Merrick Road, and seven more over the Millburn Road to Hempstead, and then five back to Queen's. There are three cities where controls will have to be established. Hicksville, on the Hicksville Road, Freeport, on the Merrick Road, and Hempstead, famed in the Revolutionary War history. The turn into the Hicksville Road rises slightly, but that into the Merrick Road may be made with a wide swing, and the others come in controls. The Queen's turn is a rather sharp turn. The race will probably take place in July, so as not to clash with the Gordon-Bennett Race, and the first entry for the race—W. Wallace with a De Dietrich car—has already been received.

RACES, RECORDS, AND TRIALS.

SIDE-SLIP TRIALS OF THE A.C.G.B.I.

On Saturday, May 7th, the "slipping" tests in connection with the A.C.G.B.I. Side-slip Trials was held in the Locomobile Company's Garage, South Kensington. A portion of the concrete floor of the riding school, measuring about 12 yards by 6 yards, had been covered with Thames mud—well "puddled" with special soft-soap—so that the surface was well calculated to give a very severe test to any of the anti-skid devices. A distance of only 88 ft. was available for acceleration before the cars reached the prepared stretch, and consequently the speeds were in general very slow, with the exception of Mr. Cavendish, who attained a proportionately higher speed during his first trial, and very nearly succeeded in running into an office at the far end, a feat which was performed by another competitor later in the proceedings, with somewhat disastrous results—to the office.

For the first test the cars were despatched from the starting line, and had a slightly tortuous run on to the greasy ground. When in the middle of this they had to lock their steering wheels hard over to try and turn sharply round a post. It was very soon evident that this was a physical impossibility for any of the cars entered, because the front wheels—unprotected by any device—with the exception of the Vivian—refused to grip, and the car continued to travel in a straight line. Without a single exception, there was no car entered that effected a sharp turn in the centre of the prepared patch, and consequently the relative effectiveness of the non-skid devices could not be properly shown. Of course, their effect was noticeable, as compared with the evolutions of Mr. Joy in the Club car, shod with plain tyres, but the greatest difference was seen when an *unofficial* car, shod with Sampson treads on *all four wheels*, proved that it could successfully make a sharp turn in the middle of the mud. The Vivian device, which we described in our issue of January 23rd, 1904, and which, as our readers are aware, consists solely of a combined hard and soft rubber tread, was attached to all four wheels of the test car, and this was apparently as ineffective as the rest. It must be recollected, however, that the test was a peculiarly severe one for this device owing to the hardness of the lower mud preventing anything but metal devices finding a grip on the concrete floor. The mechanical devices, which included those entered by Mr. H. S. H. Cavendish, Mr. W. Hunt, Messrs. Rourke and Hosborough, and Mr. Alex Nicholson (all of which we described in our issue of April 30th), were in as bad a plight as those in which the device is fixed to the tread. In every case



One of the Cars just entering on the greasy patch. Major Lindsay Lloyd noting the result.

The motor bicyclist who "wouldn't," passing over the prepared portion.

THE SIDE-SLIP TRIALS OF THE A.C.G.B.I.—The "Slipping" Tests at the Locomobile Company's Riding School.

the mechanical attachment operated beneath the rear of the car and was useless in preventing the skid of the front wheels. They doubtless had much to do in keeping the rear of the car straight, but their paths were not of sufficient curvature to make it obvious as to whether the back wheels would have skidded or not had the device not been down. After the cars came the bicycles, and this exhibition was by no means an edifying one, for every rider was thrown (but no one hurt) directly he turned his front wheel, the mud being much too thick for the light weight of the cycles compared with the cars. Some of the riders were sufficiently plucky, or foolhardy, to make two or three successive trials with similar results. One gentleman, however, was sufficiently cautious to steer straight all the time—much to the amusement of the audience.

The next portion of the trials consisted of applying the brake when the car was midway across the prepared stretch, and this certainly gave more definite results, although no comparative data can be given at present.

THE SIDE-SLIP TRIALS OF THE A.C.G.B.I.—
The "Slipping" Tests.

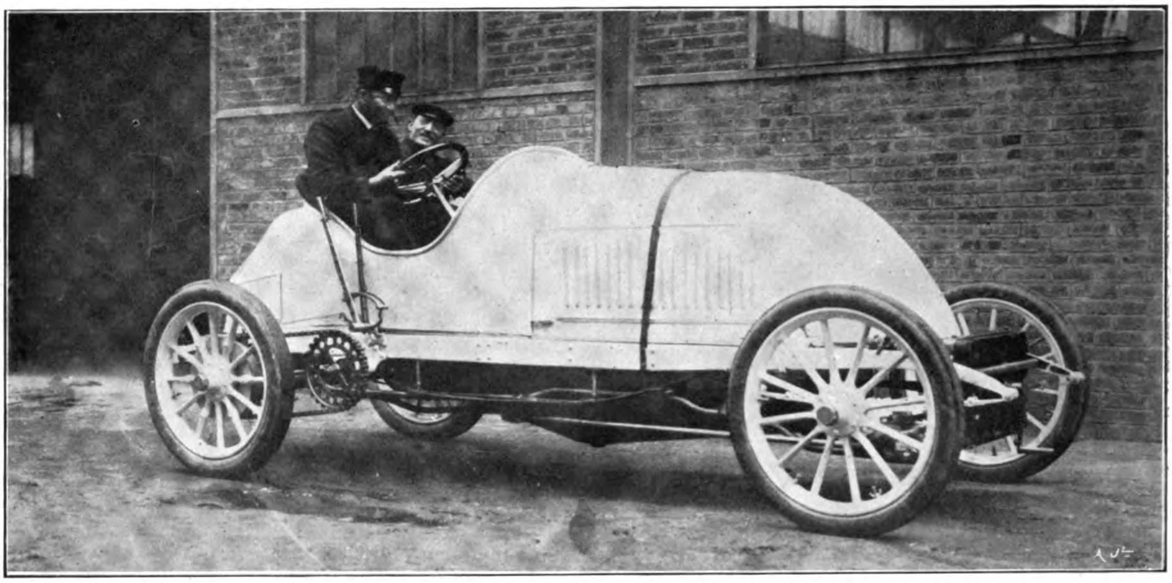
Mr. Basil Joy, the Technical Secretary, does a bit of "slipping" with his feet in order to even out the grease.

The trials, which started at 11 a.m., were adjourned at 1.30 p.m. for luncheon, and after that interval they proceeded with sundry other experiments. Each car, after being brought to rest in the centre of the treated patch, was made to start both forward and backwards, and to then pull up immediately after a fair start had been made. A very considerable difference was noticeable in the amount of slip of the driving wheels on the various cars, both when starting and when stopping, and on some cars it was very interesting to see that the front wheels moved over the grease without revolving, when the car was started, showing the extreme slipperiness of the soapy mud. In these tests the mechanical devices were, of course, useless to secure adhesion of the wheels to the ground.

In the absence of official results of these trials no data can be given. The judges, however, gave a considerable amount of care and attention to the various points which were brought out during the trials above referred to, and they took numerous measurements relating to distances skidded and speeds of travel, so that much valuable data is probably in their possession. The event was one of the most interesting which we have had the pleasure of attending, and is one that cannot fail to have an important bearing on future development towards laying that bogey to the motorist—side-slip.

The Glasgow-London Run.—Last week Mr. John Adam, chairman of the Section, and Mr. R. J. Smith, the honorary secretary, drove over the route from Glasgow to London and back for the purpose of fixing the various points at which the stages are to finish, and to make the other necessary arrangements along the route.

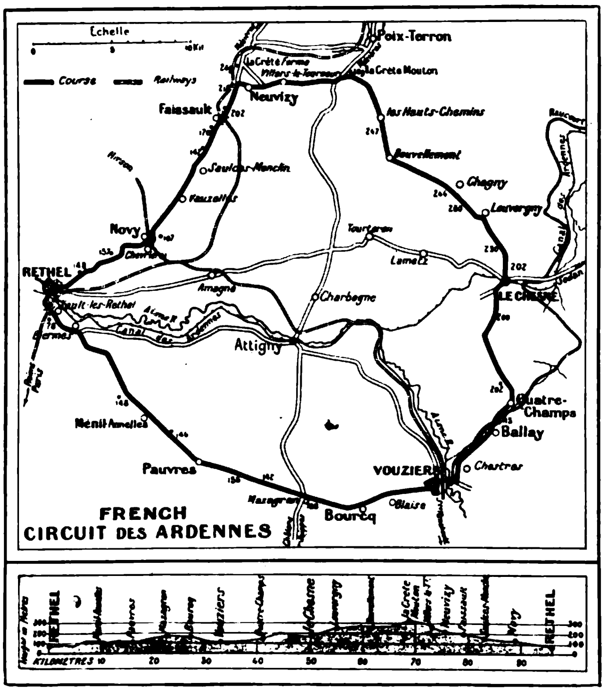
THE Belgian National Circuit, originally arranged for May 27th, has been altered to commence on May 30th and will terminate on June 3rd. The route has also been somewhat modified from the original itinerary mapped out. The hill-climbing speed test will be held on June 1st on the Spa-Malchamps Hill, and kilometre tests will also be held on the next day.



GORDON-BENNETT FRENCH ELIMINATING TRIALS.—Mons. Achille Fournier on his Hotchkiss Racing Car—which will start 14th in the Trials on May 20th.

GORDON-BENNETT ITEMS.

The Prefect of the Ardennes has formally authorised the French Eliminating Trials, to take place in his district. The revised route determined upon by the officials is given in the map which we publish this week, taken from *L'Automobile.* The start will be from Mazagran between 4 and 5 a.m. on May 20th, the cars being sent off at intervals of two minutes. There will be five neutralised points, viz., Vouziers, 10 mins.; Le Chesne, 5 mins.; Bouvellemont ½ min.; Rethel, 10 mins.; and Novy Level Crossing, ½ min. The full distance is 93·650 kiloms. The longest run without a stop is about 30 kiloms.



GORDON-BENNETT FRENCH ELIMINATING TRIALS. May 20th.—Map of the new course in the French Ardennes. From 'L'Automobile.'

The following is the official order of starting, determined by ballot, for cars and drivers, a summary of which we gave in our last week's issue :—

1. Gabriel (Diétrich).
2. Baras (Darracq).
3. Hanriot (Bayard).
4. P. de Crawhez (Hotchkiss).
5. L. Théry (Richard-Brasier).
6. Le Blon (Gard.-Serp.).
7. Salleron (Mors).
8. H. Farman (Panhard).
9. Rigolly (Gob.-Bril.).
10. H. Rougier (Turcat-Méry).
11. Jarrott (Diétrich).
12. Béconnais (Darracq).
13. Guders (Bayard).
14. Achille Fournier (Hotchkiss).
15. Caillois (Richard-Brasier).
16. Chanliaud (Gard.-Serp.).
17. A. Léger (Mors).
18. Teste (Panhard).
19. Duray (Gob.-Bril.).
20. De la Touloubre (Turcat-Méry).
21. Baron Forest (Diétrich).
22. Wagner (Darracq).
23. A. Clement (Bayard).
24. Amblard (Hotchkiss).
25. Stead (Richard-Brasier).
26. Pelser (Gard.-Serp.).
27. Lavergne (Mors).
28. Tart (Panhard).
29. Alex. Burton (Gob.-Bril.).

Of the 29 drivers, 22 are French, 5 English, 2 Belgian.

No assistance in controls will be permitted, any work having to be executed by the driver and his mechanician. Outside the controls extra help may be employed and reported.

On the Taunus course for the big race, the neutralised points, Graf Sierpstorff states, will be Mesingen, Weilburg, Limburg, Idstein, Kœnigstein, Oberusel and Homburg; the time totalling to about 43 minutes each circuit, making for the four circuits roughly about three hours. The special telegraph and telephone instalments for the day will cost £3,000, and every provision is being made at the starting point to cope with the requirements of the inner man during the day by erecting special restaurants.

Good facilities for reaching the Saalburg from Homburg exist in the electric railway and the ordinary railway, the latter taking only about ten minutes to cover the intervening distance.

Four thousand eight hundred men will be employed to guard the course in addition to those who will be at the starting point, and about eighteen miles of iron fencing will be erected for protecting portions of the road. Prince Henry of Prussia, on behalf of his brother the Emperor of Germany, is personally supervising the more important arrangements which are now in progress.

Reports upon the American team render the position there almost hopeless. Last week some official speed tests were made on an asphalt track at Cleveland by Barney Oldfield on the Winton Bullet No. 2, and L. P. Mooers in his Peerless car. The track was in bad condition, and placed the vehicles at a disadvantage as to speed. Water circulation brought Oldfield to a stop after seventy miles. Mooers at fifty miles had to stand by to look after a damaged connecting rod and a broken pinion. Both drivers made an application for a fresh trial, which, however, the club committee, after consideration, declined to grant. Christie and his car are to be tried this week, after which, no doubt, some official pronouncement will be made in regard to the final decision. It is broadly hinted in certain quarters that if the A.C. of A. are wise they will refrain altogether from nominating a team for this year's race.

Long-distance Runs and the Automobile Club.—We have received officially the two following resolutions for publication, passed by the executive committee of the A.C.G.B.I. this week:—

"That a public statement be issued from the Automobile Club, pointing out that some recent long-distance attempted 'non-stop' runs had not been held under the auspices of the Automobile Club or under the observation of its officials, and that attention be called to the fact that the club is prepared to properly supervise such runs under regulations which are well known to the trade."

"That if the name of the club appears in public reports of the non-stop or other road trials which are not held under the auspices of the club, those concerned shall be liable to suspension from the right to take part in motor competitions in this kingdom and elsewhere."

Motor Cycle Reliability Trials in Lincolnshire.—The first round of an interesting motor cycle trial, organised by the Peterborough and District Motor Club, took place on Thursday afternoon, May 5th. The course was from Peterborough to the top of Cross-o'-Cliffe Hill, south of Lincoln, *viâ* Market Deeping, Bourne, Aslackby, Folkingham, Sleaford, main road to Lincoln, and returning to Peterborough the same way, the distance being 100 miles. The conditions of the run were that competitors should only be allowed to dismount at the turning point and for congested traffic. No adjustment to the machines, other than could be done while riding, was permitted, and the speed limit did not average more than 20 miles an hour or less than 12. Delightful weather favoured the event, and the roads were in splendid condition. The undulating nature of the route, especially between Bourne and Folkingham and Sleaford and Lincoln, thoroughly tested the hill-climbing capabilities of the different machines. There were 15 entries and 13 starters. Of the latter 7 completed the distance in accordance with the conditions, and thus qualified for the second round. These were:—T. S. Rickman (Peterborough) on a 2½-h.p. Bradbury (Clincher tyres), P. Mays (Bourne) on a 2¾-h.p. Vinco-Minerva (Palmer tyres), P. R. Heighton (Peterborough) on a 2¾-h.p. Vinco-Minerva (Clipper tyres), B. Gibson (Bourne) on a 2¾-h.p. Vinco-Minerva (Palmer tyres), T. Woodhead (Peterborough) on a 2¾-h.p. Bat (Clincher tyres), B. C. Holes (Peterborough) on a 3½-h.p. Vinco-Minerva (Clipper tyres), and E. A. V. Sturton (Peterborough) on a 2½-h.p. Vinco-Minerva (Palmer tyres). The other competitors failed to finish, chiefly on account of puncture troubles. J. C. Whattoff (Baston) on a 2-h.p. Bradbury (Dunlop tyres) was very unfortunate, as he punctured after completing 98 miles, and F. T. Heighton (Peterborough) met with a similar mishap after travelling half the distance. Redhead (Peterborough) fell through skidding on the tram lines at the start, and Gray collided with a wall in turning a corner at Werrington. Neither, happily, were seriously injured. The prizes offered in connection with the trial include a handsome silver cup to the first, gold medal to the second, and a silver medal, with gold centre, to the third. Certificates will also be awarded to those who complete the 100 miles non-stop.

THE A.C. of Nice have tentatively selected February 5th to 19th for the 1905 Nice week.

IT is officially announced that the start of the Carburettor Competition of the A.C. de France has been postponed from Monday next until the 24th instant.

Exelberg Hill-climb.—Hieronymus, on a Spitz car fitted with a 60-h.p. Mercedes motor, made the best time in this event, run over a distance of 4·2 kilometres on Sunday last, his time being 4 min. 29⅖ secs. The best times for the various classes were:—Voiturettes, F. Opel, 24-h.p. Opel-Darracq, 4 mins. 46⅘ secs. Cars, Hieronymus, 60-h.p. Mercedes-Spitz, 4 mins. 29⅖ secs. Motor Bicycles under 50 kilogs., Nikodem (Puch), 4 mins. 57⅕ secs Motor bicycles under 65 kilogs., Wondrich (Laurin Klement), 7 mins. 38⅗ secs.

MOTOR BOAT RELIABILITY TRIAL.

THE rules of these trials, under the auspices of the A.C.G.B.I., have been issued. They will take place in Southampton Water on July 26th and 27th, and will be open to all boats fitted with internal combustion engines, which must be fitted with efficient silencers. The trials will be conducted under the racing rules of the Marine Motor Association and the Board of Trade rules of the road at sea, and the racing rules of the A.C.G.B.I. as far as they apply. The course will be an approximately rectangular one, which will be traversed on each day for a period of 10 hours. Each boat must carry sufficient fuel for the two days' run of 20 hours. There will be five classes, as follows:—

	Entrance Fee.
1. Yachts' dinghies, up to 15 ft. over all	£3
2. Yachts' launches, up to 20 ft. over all	4
3. Yachts' launches, up to 25 ft. over all	5
4. Yachts' launches, up to 30 ft. over all	6
5. Launches of over 30 ft. in length over all ...	7

Entries close on June 11th at ordinary fees, and on July 16th at 25 per cent. increase. Unless 10 entries are received by June 11th the committee have the right to abandon the trials. Marks will be given for arriving at the awards as follows:—

Reliability—100, less 1 for every minute or part of a minute stoppage.

General Condition after Trial.—100 or less, to be awarded at the discretion of the judges.

Speed.—50, less 1 for every tenth of a knot per hour less than the fastest boat in the class, all such speeds being calculated for comparison on the basis of the Marine Motor Association time scale. The speed is to be taken as the mean speed of all completed runs, all stops to count in the running time.

Safety.—30 or less, to be awarded at the discretion of the judges, according to fuel and arrangements.

Economy of Fuel.—20 to the most economical boat in pence per M.P. per hour; 2 marks to be deducted for each tenth of a penny increase in relative cost of fuel per M.P. per hour above the most economical boat. (M.P. is the motor power under the M.M.A. formula.)

Boats in Classes 1 and 2 must show a mean speed for the 20 hours' run of 4 knots per hour; in Classes 3, 4, and 5, 5 knots per hour. The start will be from standing, with 10 minutes' previous warning.

It is to be hoped that a large entry will be received for these trials, the first of their kind, and that important results will be obtained which will lead to the largely increased adoption of internal combustion engines for lifeboats, tugs, canal work, and similar services.

DR. GRETH has been making another trial with his airship, ascending 500 feet and travelling six miles successfully, ultimately landing without accident. Dr. Greth does not appear to have been so far successful in returning to the point from which he started.

Mr. and Mrs. Charles Glidden, of Boston, Mass., can claim to have made, so far, the longest pre-arranged tour on the same car, in the world. Last week the start for a further section of an attempt to total up 40,000 miles of travel was made from the Carlton Hotel. Mr. and Mrs. Glidden on their 24-h.p. Napier, are seen in our picture just about to enter on their first stage towards Scotland. The full tour during the next two years will, it is anticipated, occupy fully 500 days, only the most suitable periods during each year being selected for the respective countries traversed. As a test for the durability of the Dunlop Non-Slipping Tyres with which the car is fitted, a log of the mishaps and delays caused by punctures and other tyre troubles—or their absence—should be of immense interest at the finish of the tour.

ORIGINALLY fixed for August 13–14, the Calais to Dover Race for Motor Boats, organised by the A.C. of France, will now, it is definitely arranged, take place on August 8th, the idea of starting from Boulogne having been abandoned. The distance is 22 knots, and the start will be at 10 a.m. The race is international, and open to boats of any size and motive power, and will be held under the rules of the A.C. de France. At the same time the race for the Recopé Cup, for boats using ordinary petroleum, and for the Quinnones de Leon Cup, for boats using denaturalised alcohol, will be run off. Entries will be received up to July 15th, the fee being 100 francs for boats up to 8 metres long, and 200 francs above that length. We have already dealt fully with these events, and the following further interesting points under the regulations of the French Club should be specially noted.

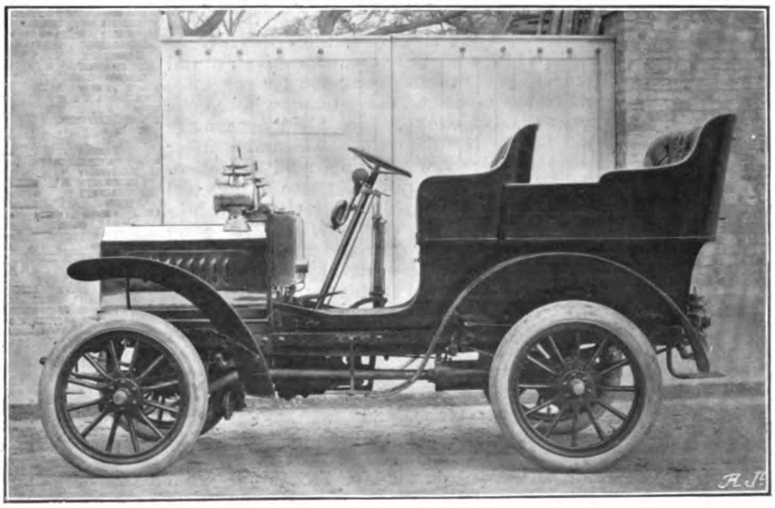
Boats below 8 metres must carry three life buoys and boats over 8 metres must carry four. Every person taking part in a race will have to wear a life belt; every boat must be unsinkable; every boat up to 12 metres must carry an anchor weighing 40 kilogs. with a length of chain 40 metres; and above 12 metres the anchor must weigh 60 kilogs. with 60 metres of chain, side lights, a chart and compass must also be carried.

Boats taking part in the race must present themselves at Calais on Thursday, 4th August, at latest, and from Thursday to Saturday may be subjected to runs out to sea. On Sunday, the 7th August, all the boats taking part in the race will be exhibited, and boats which are not present will not be allowed to take part in the race.

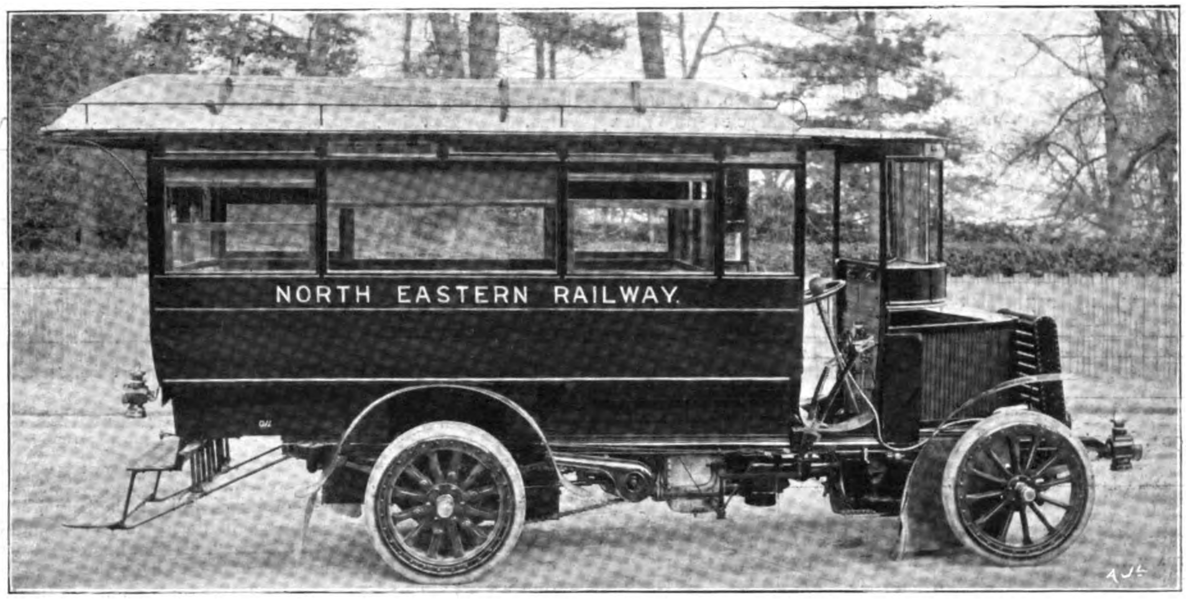
It is recommended that competitors proposing to enter for any of these races should secure an official certificate as to the size of the motor before the motor is finally put on board, and this will be accepted by the French Club. This may be obtained on application to the official measurer of the A.C.G.B.I., Mr. J. A. Smith, of 47, Leadenhall Street, E.C.

ALREADY about a dozen entries have been received for the Gaston-Menier Cup for motor boats, which will be run off, the same as last year, between Trouville and Deauville, on August 21st. The entries include Mr. S. F. Edge's Napier II., a Hutton boat, a Thornycroft racer, the famous Trefle-à - Quatre, Charley's Mercedes III., a Hotchkiss boat by Fournier, a Bayard by M. Clément, a Gardner-Serpollet by M. Legru, and Dubonnet II., which gave such a good account of itself at Nice.

Following, as this important International event does, upon the Paris to the Sea Motor Boat Race, which takes place this year, starting on August 14th and finishing at Trouville on August 19th, an enormous interest is likely to be aroused amongst British motor boat owners from the fact that the Menier Cup is now held by Mr. Edge. It was secured with a Napier boat which was, immediately after last year's event, purchased by M. Henri Deutsch (de la Meurthe).

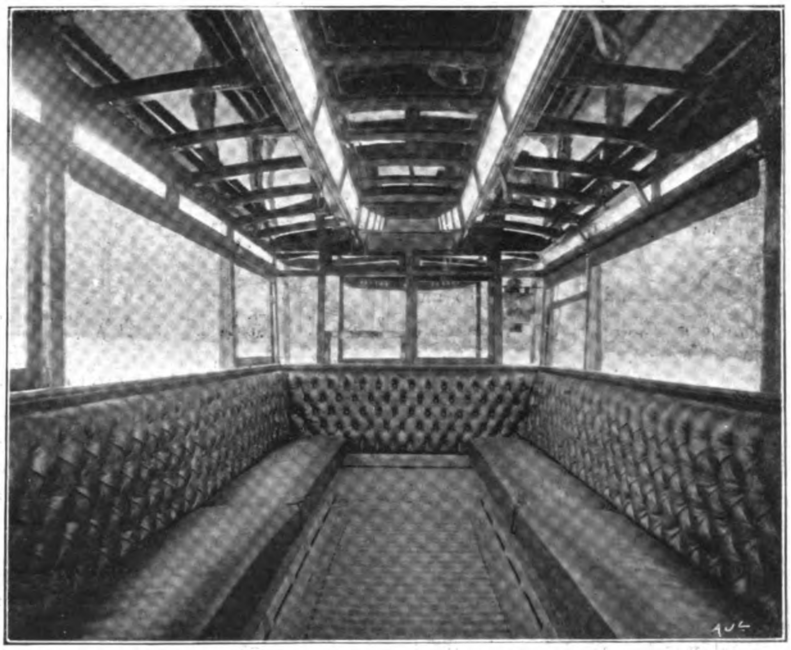


A new model for 1904 by the Simms Manufacturing Company, Ltd., is shown in our photograph above. This car is fitted with an 8-h.p. Simms Engine and Simms Bosch Magneto Ignition, and is moderately priced at £185 including the tonneau body. Three speeds and reverse are provided by the usual sliding gear, and the drive is by Cardan shaft and live axle. The circulating pump is driven off the flywheel.



We referred last week to the municipal demand for motor 'buses in several parts of Great Britain, particularly instancing Messrs. Clarkson, Ltd., in regard to their 'buses which they have supplied to the Eastbourne Corporation and the North Eastern Railway Company. We have now received from Messrs. Clarkson the above interesting photograph of their latest type of public vehicle as supplied to the North Eastern Railway Company, which is now running in regular service between Beverley and Hornsea.

AT regular intervals the Metropolitan Fire Brigade hold at their headquarters in Southwark Bridge Road public drill, when the splendid methods and training of the men can be fully appreciated. Last Saturday one of these periodical displays took place in somewhat unpleasant weather. The various items, showing rescues from a high building, &c., were gone through, and amongst a list of interesting evolutions none was more appreciated than the parade of the two new motor steam fire engines and the motor hose cart, which were manipulated with marvellous quickness, promising well for the future of this section of the fire brigade. The proceedings closed with a "call" to a fire at the chief station, in which the Waterloo Road engine reached its destination, with steam up and everything in readiness to start operations, in 3 mins. 40 secs., five other stations being equally smart taking into consideration the distance which they respectively had to travel.



The interior view is seen in our photograph of the luxurious public service omnibus of the North Eastern Railway Company, which has been supplied by Messrs. Clarkson, Ltd., of Chelmsford.

MR. HENRY J. LAWSON, together with Mr. E. T. Hooley, were on Tuesday arrested and charged at Bow Street Police Court with conspiring to defraud Alfred Joseph Payne, a licensed victualler, and remanded upon bail.

MR. ARTHUR HAMILTON LEE, M.P., First Civil Lord of the Admiralty, has just placed an order for a 28-36-h.p. Daimler carriage, and the Right Hon. Sir Hervey Bruce has recently taken delivery of a carriage of the same make.

MR. VINCENT W. HILL, the general manager of the South-Eastern and Chatham Railway, intends, we understand, to shortly start a service of motor 'buses in Bromley. These will traverse the route beween the top of Bromley Hill, Bromley North Station, Bromley South, Bromley Common, and Farnborough.

British Exports and Imports of Motor Cars, &c., for 1904.

1904	Exports, British and Irish make.						Foreign and Colonial Re-exportation.					
	No. of Cars and Value.		Parts Value.	No. of Motor Cycles and Value.		Parts Value.	No. of Cars and Value.		Parts Value.	No. of Cycles and Value.		Parts Value.
		£	£		£	£		£	£		£	£
January ..	55	25,168	3,470	78	3,000	619	35	9,223	1,011	7	249	226
February ...	65	23,913	4,280	73	3,147	234	43	18,854	1,186	11	320	45
March ...	55	24,064	5,221	49	1,787	516	43	19,756	3,230	3	98	78
April	42	15,119	5,272	65	2,249	668	37	13,859	4,057	17	549	208
TOTAL ...	217	88,264	18,243	265	10,183	2,037	158	61,692	9,484	38	1,216	557

Imports.

1904.	No. of Cars and Value.		Parts Value.	No. of Motor Cycles and Value.		Parts Value.
		£	£		£	£
January ...	335	102,866	17,906	51	1,528	2,218
February...	538	185,499	21,496	87	2,971	1,983
March ...	492	169,166	20,741	178	5,774	1,818
April ...	559	170,757	31,742	141	4,498	1,891
TOTAL ...	1,924	628,288	91,885	457	14,771	7,910

DOINGS OF PUBLIC COMPANIES.

THE Board of the Hozier Engineering Company, Limited, Glasgow, makers of the Argyll motor cars, have declared an interim dividend for the half-year ending March 31st at the rate of 20 per cent. per annum.

THE report of Brown Brothers, Limited, for the past financial year shows a profit of £27,070, from which the Directors propose paying a 6 per cent. dividend for the year, carrying a further sum of £3,000 to the reserve fund, bringing this up to £17,391.

AT the Annual General Meeting of A. W. Gamage, Limited, held last week, great stress was laid upon the increasing popularity and profit-earning capacity of the business. The keynote of the Directors was want of room, and still more room, for their ever-expanding business.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

NEW COMPANIES REGISTERED.

Acme Motor Company (Limited).—Capital, £1,000 in £1 shares. Object, to acquire the business carried on by G. E. Pearce, at 4, Belle Vue Road, Wandsworth Common, S.W., as the Acme Motor Company, manufacturers of and dealers in motors and motor cycles, &c. G. E. Pearce is first director.

Sligo Motor Service Company (Limited), Bridge Street, Sligo.—Capital, £750 in £1 shares. Object, to run motor or other cars between Sligo and Rosses Point, and between Sligo and Bundoran.

Vogt Engines (Limited), 56, Cannon Street, E.C.—Capital, £240,000 in £1 shares (40,000 preference). Object to acquire all the assets and undertaking of Vogt Motors (Limited), and to carry on the business of manufacturers of motors, traction and other engines.

FORTUNATELY for the Anglo-American Motor Car Company, Limited, on this side of the water, a consignment of Cadillac cars were already on the sea before the Cadillac factory was, as we announced last week, burnt down. The British agents will, therefore, still be able to make prompt delivery under the circumstances, and, in any case, as before stated, about thirty days will enable the factory to resume regular delivery of cars.

THE United Motor Industries, Limited, inform us that the Napier car which was lately driven 2,000 miles by Mr. Cecil Edge, throughout England and Scotland, was lubricated with their "D" oil, and "Castle" accumulators only were used on the car. There was not the slightest trouble with lubrication or ignition the whole of the journey.

CLUB DOINGS.

Scottish Automobile Club (Western Section).—One of the informal gatherings provided for in the Section's list of runs was held at the Marine Hotel, Troon, last Saturday afternoon. The day was cold and rain threatened, but that notwithstanding over 20 cars turned up. The hotel was full of the lady golfers, congregated for the championships held during this week, and in spite of the seductive attractions of brassey, mashie, and cleek, the motor cars received much merited attention. There was a cold run back on the part of cars from the Glasgow district in face of a bleak east wind, but it cannot be said that enthusiasm was in any degree damped in consequence. For some time the Section have been considering the attempted methods of subduing the dust nuisance, and enquiring into the best means at their disposal of assisting in solving the problem. They have now decided to conduct experiments with oil or westrumite, and have obtained the consent of the Upper Ward District Committee of Renfrewshire County Council to use certain roads in the vicinity of Glasgow for the purpose.

THE Committee of the Yorkshire Automobile Club propose making arrangements for garage accommodation in the various towns in the country, and to this end are desirous of information, applications and recommendations respecting such accommodation, so that a full list may be made out for the convenience of motorists. The meet of the club for to-day (Saturday) is at 5 p.m. at the Devonshire Arms, Leeds, when the run will be to Bolton Woods.

WROXALL ABBEY, upon the invitation of the President, is the venue to-day (Saturday) of the Midland Automobile Club.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published May 12th, 1904.

8,689. A. F. FROMENT AND A. S. DAUDET. Dust guards and mud guards.
8,835. T. B. F. CONTE AND J. M. ARNAUD. Exhaust silencing apparatus.
8,988. J. M. WELLINGTON, Internal combustion engines.
9,235. B. J. DIPLOCK. Mechanism for steering.
11,421. A. G. MELHUISH. Gas or oil engines.
11,660. C. A. HAMILTON. Internal combustion motors.
12,791. P. M. GAYON. Friction clutch for motor cycles.
13,357. J. GROUVELLE AND H. ARQUEMBOURG. Automatic carburettor.
13,500. W. H. CROSSLEY AND J. ATKINSON. Automatic cut-off gear.
13,788. W. NEWBERY. Change-speed-gear.
15,008. J. H. STANFORD AND W. GRAINGER. Mud guards.

Applied for in 1904.

Published April 28th, 1904.

3,173. — SMITH. Friction clutches.
3,207. — VOJACEK. Devices for aerial navigation.
3,968. — BILLINGHURST. Internal combustion turbine.
4,775. T. F. RENE. Sparking plugs.
4,891. S. BROTHERHOOD AND C. W. BRYANT. Electric ignition apparatus.
5,129. S. COUMONT. Vaporisers.

Published May 5th, 1904.

5,314. P. T. SOMERVILLE-LARGE. Pneumatic tyre cover.
5,592. L. MILES. Exhaust silencers.
5,824. H. LUTHI. Electric igniter.

Published May 12th, 1904.

3,664. — BRILLIE. Carburetting apparatus.
4,398. O. G. A. LITTMANN. Motor-driven vehicles.
6,442. G. PETZEL. Explosion engines.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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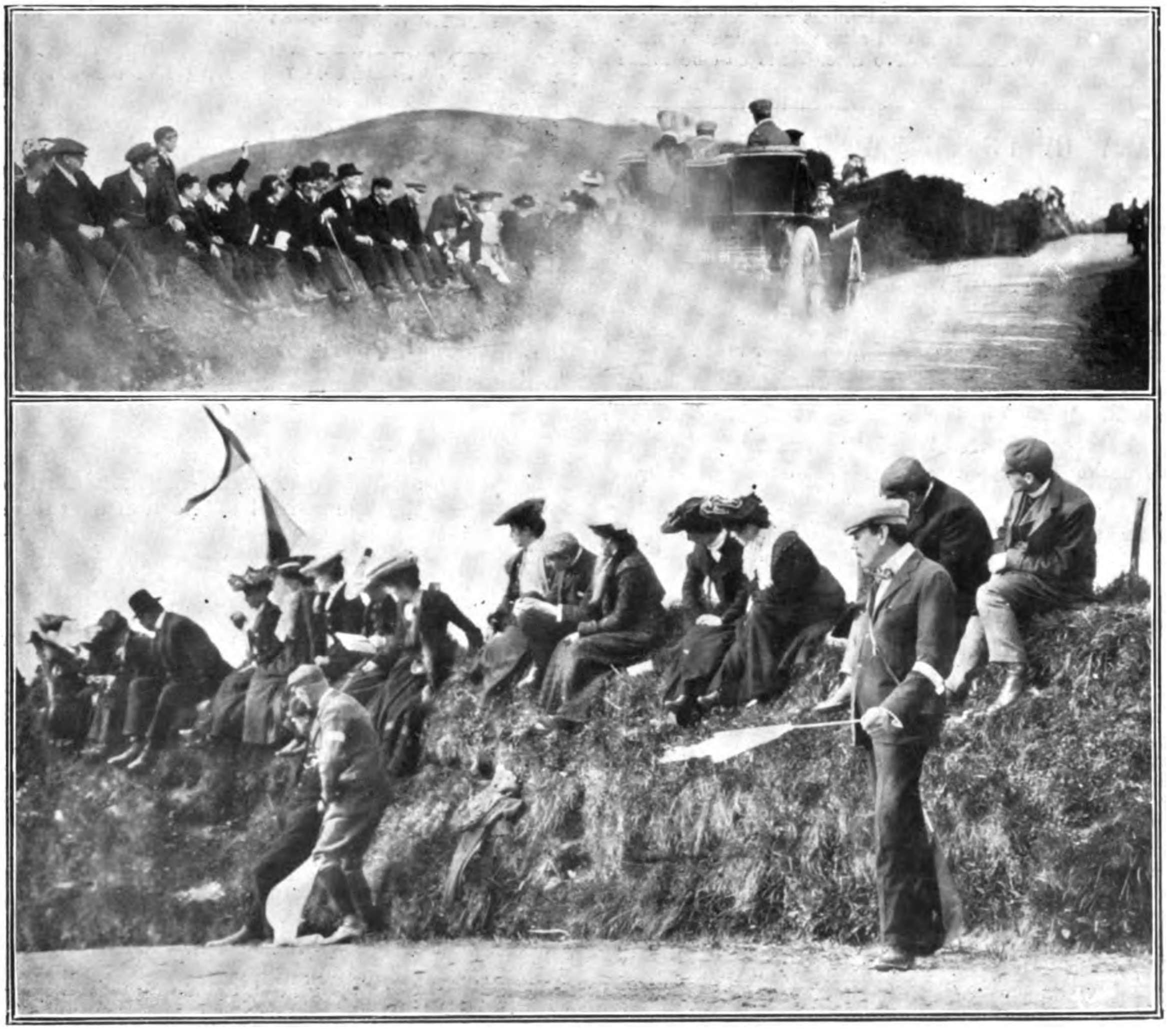

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—The Governor of the Island, Lord Raglan, took a deep personal interest in the whole of the events. On Wednesday he carefully inspected the Hill Climb Course, and is seen in our top photograph driving over the road in Car B.H. 91. In the lower picture Professor Vernon Boys (with the flag down) is officiating as starter in connection with Mr. F. J. Ochs, who is to the right in our picture.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
May 28 ...	Auto Cycle Club Combined Run to Yarmouth.
May 28 ...	Nottinghamshire Club Hill Climb.
June 11 ...	Automobile Races, Ranelagh Club.
June 27–July 2	Motor Bicycle Endurance Trial.
July 26–27 ...	Reliability Trials for Motor Boats.
July 30 ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
1905.	
Mar. 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
May (or July 25)	Circuit des Ardennes (A.C. Belgium).
May	Guadarrama Hill Climb (A.C. Spain).
May 23–31 ...	Aix-les-Bains Week.
May 24 ...	Carburettor Trials (A. C. de France).
May 30–June 3	Circuit National Belge.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 15–23 ...	Ostende Week.
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 22 ...	Kiel Motor Boat Races.
July 23–25 ...	Lucerne Motor Boat Races.
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 8-9 ...	Calais-Dover-Calais (motor boats).
Aug. 10 ...	Calais-Boulogne-Calais (motor boats).
Aug. 14–20 ..	Paris-Deauville Motor Boat Race.
Aug. 22 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Result of the Eliminating Trials.

WE this week complete our account of the events in the Isle of Man which formed the Eliminating Trials for the Gordon-Bennett Race, and it must be a source of great congratulation to everyone concerned, particularly to the Races Committee, that the events went off so satisfactorily.

As was shown in the Gordon-Bennett Race last year, the Automobile Club have again proved that they know how to organise and successfully carry out a competition of this sort as well as any other body, and, perhaps, rather better than most.

Everyone will feel considerable regret, therefore, at the unfortunate accident that occurred to Mr. Earp on the last day, and that the general satisfaction over the event must be considerably impaired by the unfortunate discussion that has arisen over the committee's award. We refer, of course, to the exclusion of Mr. Earp from the English team and the express statement by the committee, that, had it not been for the accident which occurred to him and his car (which, as a matter of fact, was not actually connected with the competition) they would have awarded him second place.

The Gordon-Bennett Race is the most important event in the motoring year. Mr. Edge, in a recent article in a popular periodical, states it may be taken as representing £50,000 in cash to the successful competitor. The Races Committee had absolute discretion in making their selection, and had they announced their actual selection and made no mention of Mr. Earp and his car, nothing could have been said whatever might have been thought and felt. As, however, the Races Committee admitted (in the note they appended to their award) that both car and driver did so well that they would, but for the accident, have been awarded second place, it is impossible to avoid regarding the immediate decision to exclude them under the circumstances as rather precipitate, and to sympathise with the protest which Mr. Edge has addressed to the Press generally, and which we reproduce in another column. A few days' delay in announcing the final decision of the committee would have done no harm, and it would have given time for mature consideration of the entire position. It seems a pity this course was not adopted.

It is now contended that the car can be reinstated in its original condition without any difficulty, as the accident has affected none of the vital portions of the mechanism. It is also maintained that Mr. Earp is practically quite well again, and that both he and the car would be able to give as good an account of themselves in the actual Gordon-Bennett Race as they did in the Isle of Man.

Under these circumstances, though we feel that Mr. Edge's protest appears to be justified by the facts as at present known, we conclude that there are other circumstances which have influenced the Races Committee in coming to their decision, and that they have not as yet, at any rate, felt called upon to make these public. It is unfortunate that the sympathy which every one naturally feels for Mr. Edge under the circumstances has been to some extent discounted by the appearance in the Press of a statement to the effect that unless Mr. Earp is reinstated Mr. Edge will not drive in the Gordon-Bennett Race at all. We feel sure, however, that he is too good a sportsman to really do so.

◆ ◆ ◆

Failure of the Dover Demand for the 10-mile Limit.

EVERY automobilist in the country will probably rejoice that the Local Government Board has found the case put forward by the Dover Corporation in support of its demand for a 10-mile limit through the town as weak as it appeared to be to all who were present at the proceedings, and to all who read the report of the case in the Press. A letter has been addressed to the Dover Corporation by the Local Government Board stating that the Corporation had failed to show that the circumstances prevailing in their town differed essentially from those in any other town, and that the President of the Board was unwilling to reduce the speed until it was shown that the safety of the public demanded it. This wise and sensible decision, upon which Mr. Long is to be congratulated, is in accord with the view put forward in the circular addressed by the Local Government Board to the various local authorities when sending out their first batch of orders. This circular, it will be remembered, stated that the provisions of the Act fully ensuring the safety of the public were so drastic that the Board considered it wise to wait and see whether they proved effective before in any ordinary case adopting the reduced speed limit of 10 miles per hour. The decision of the Board in the Dover case is dictated by the same sound view of public policy which was expressed in this passage of their circular, and we trust it will have the effect of discouraging any other local authority from putting forward or persisting in maintaining a similar demand.

◆ ◆ ◆

Not a Case for Sympathy.

IN spite of Mr. Justice Darling's definition of the London street "refuge" as consisting of a lamp-post, a policeman, and stones round them, it ought to be looked upon as a sacred precinct, at any rate in the sense that anybody stepping from it can feel confident that the traffic on either side of it is going in its proper direction. To drive on the wrong side of it, therefore, no matter what the provocation may be, in a crowded city like London, is a very improper thing to do, as anybody, anticipating that all the traffic were going the other way, might suddenly step backwards in front of you and a serious accident occur. The Hon. Claude Hay, M.P., on Tuesday last, drove on the wrong side of a refuge in the City. He was brought up at the City Summons Court before Sir Joseph Renals, but as he was wrongly summoned for driving a motor car so as to endanger the free passage of persons in St. Paul's Churchyard, Sir Joseph Renals dismissed the case. He declared, however, that he would certainly have convicted had the summons been properly worded, and had the defendant been summoned, as he ought to have been, for driving on the wrong side of the refuge. With this statement of Sir Joseph Renals' we fully sympathise, and considering how important it is that automobilists generally should pay the most careful attention to such commonsense police regulations as those prevailing in the Metropolis, we trust that all car drivers will lay Sir Joseph Renals' words to heart, and carefully abstain from committing this class of offence.

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The Principle of the Aeroplane applied to the Boat.

A MOTOR boat which presents some interesting features is described as having made some successful attempts in the neighbourhood of Paris. The boat is provided with flat inclined planes fitted beneath it. When the boat is at rest the five fins are well below the surface of the water, but they are so inclined that when it begins to move the boat rises and they come to the surface, along which they glide on much the same principle as the aeroplane glides in the air. The result is that a smaller proportion of the hull of the boat is immersed beneath the surface of the water than would be the case if it were not provided with these fins, its propulsion, therefore, requiring less power than would otherwise be the case. Thus, we are informed that a boat fitted with a 14-h.p. De Dion-Bouton motor, *and* the fins, attained a speed of nearly 32 kiloms. (over 19¾ miles) per hour. Another rather curious feature of construction is that the single propeller is placed equidistantly between two rudders.

If the results mentioned are reliable—and the source from which we obtain the information is a trustworthy one—the experimental boat is interesting as a further development of the principle involved in making racing boats with flat bottoms like the Napier models and some others. The subject is also one which is not remotely related to certain problems that present themselves in aeronautics. The boat running practically on its fins resembles an aeroplane. A boat proceeding in the ordinary manner, with hull largely submerged, resembles the cigar-shaped airship of the Santos Dumont type. The superior greater speed of the "aquoplane" boat tends to support the view, which the aeronauts of the heavier-than-air school have all along maintained, that when the motor aeroplane becomes a practical appliance it will attain speeds which will leave the navigable balloon far behind it in any race in which the two types of machine may compete.

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Be Careful about your Numbers.

THE automobilist is so liable to the infliction of numerous pains and penalties under the Act of 1903 that it is a pity that he should ever fall within the clutches of this decidedly drastic measure through being ignorant of its provisions. Such, however, was, we feel convinced, the case of an unfortunate motorist who was haled before Mr. Fenwick at the South-Western Police Court on a recent occasion, and charged with committing an offence under the Act, by not having his car number properly painted on the vehicle. The front number with which his car was adorned conformed in all respects to the requirements of the Act, that is to say, it was a white number on a black background. The number at the rear was also white, but, unfortunately for the motorist, was emblazoned on a red field instead of a black one. This is, of course, not strictly in accordance with the Act, and the magistrate was bound to convict. Everybody, however, will, we think, feel that to fine the offender £2 was dealing with the case very severely. The magistrate might, we think, have inflicted a more considerate penalty as the error was merely due to the original number having been lost and the error in colouring perpetrated while a fresh number similar to the original one was being prepared. Motorists would do well, therefore, to pay due attention even to such apparently unimportant matters of detail, as it is evident that if they neglect them or make mistakes in regard to them they cannot count on even reasonable indulgence.

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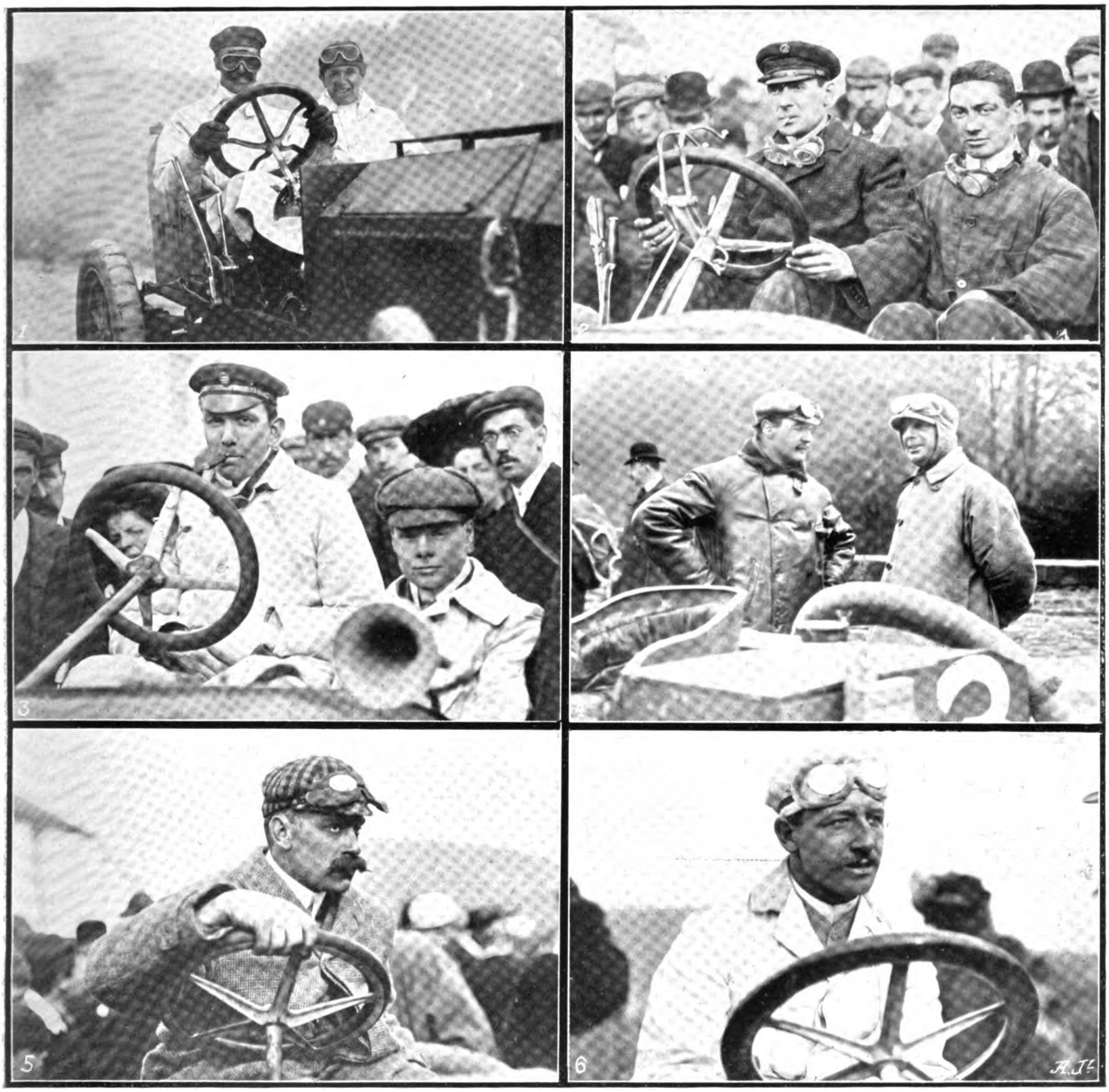
A Conviction That We Hope Will Produce Some Effect.

THOSE of us who remember the early days of bicycles will call to mind not only the general hostility with which they were regarded, but the cowardly trick of hansom cab drivers of drawing together when a bicycle was between them with a view to "accidentally" upsetting the unfortunate rider, while in most cases the truculent cabbies would be far away before the victim extricated himself from the *débris* of his machine, and succeeded in extracting a policeman from one of those retreats in which, when wanted, they usually ensconce themselves. Something of the old spirit seems to have been evoked from its long slumber by the advent of the motor bicycle. At any rate, a cab driver of the name of Harrison appears to have been attempting to play some such contemptible trick upon Mr. Trevor Davys, a surveyor of St. Albans, who was riding his motor bicycle along Albany Street early last month. Mr. Davys was knocked off and somewhat seriously injured, but fortunately he was able to bring up the cabman before Mr. Curtis Bennett at the Marylebone Police Court. When the defendant Harrison appeared before Mr. Curtis Bennett and it was suggested that on the occasion in question he had been under the influence of liquor, he steadily maintained that he was precisely as sober as he was at the present moment. This Mr. Curtis Bennett readily believed. The more so as he declared that it was quite obvious that Harrison had already visited at least one public house on his way to the police court. Harrison's reputation was hardly increased by the fact that a witness whom he brought with him to support his statement of the case was at once turned out of the witness box as hopelessly intoxicated. Mr. Curtis Bennett fined the cabman £3 and 23*s*. costs, remarking that he was not quite convinced that he really acted wilfully, to which doubt the cabman is, perhaps, entitled, as a man who could present himself in such a condition in a police court can hardly be ever capable of *wilfully* intending anything. But we trust that the conviction and subsequent penalty imposed will encourage other cabmen *not* to do likewise.

Further Evidence before the Royal Commission on London Traffic.

WE have referred from time to time to the evidence given before the Royal Commission on London Traffic, and we cannot avoid the growing conviction that the mass of these valuable data and opinions, the fact that the principal witnesses have put forward such a number of vital suggestions, and have to so large an extent agreed with one another, will ultimately be productive of some tangible result. It scarcely seems possible that, after so many important persons have been examined in regard to this great problem, we shall be allowed to slide back into the old slough of despond, in which everybody uses strong language and nobody does anything. As wide publicity as possible should be given to the evidence put before the Commission, as it tends to ensure the ultimate and early adoption of some comprehensive and sweeping scheme. It is because we hold this view that we have so often noticed in our columns the evidence that has been previously tendered, and certainly very little of it has been more well considered, or better thought out, than that which was recently given before the Commission by the secretary of the Roads Improvement Association, Mr. Rees Jeffreys. Of course everyone could have predicted what Mr. Rees Jeffreys' evidence in its main outlines would be, as he has hammered in his views in a variety of different directions for a considerable time past. But it is an advantage to have his ideas of the position succinctly summarised. The principal weakness in our present system, or want of system, to which Mr. Jeffreys attributes what he rightly calls the chaos of mean streets which forms so large a portion of London, he attributes to the multitude of controlling authorities and the absence of a single central authority to control them all. Everyone is familiar with the muddle that reigns in London streets, and it is no exaggeration to say that workmen have been detected pulling up asphalte that has just been laid down, and hurrying their work so that they might get it all up before it was cold and hard. But even those who have observed this phenomenon would probably be surprised to learn that London is a prey to the (mis-) management of 113 separate and independent highway authorities. There is no one central authority to control them, and they fight gaily among themselves. This constant conflict of man with man, and authority with authority, may have made a great nation, but it has certainly made a hopelessly-congested metropolis. The key to the situation, in the opinion of the secretary of the Roads Improvement Association, is that a capably constituted new authority should relieve the local Bumbles of their functions, and be empowered to carry out the needful reforms. That its field of operations should extend 25 miles in every direction from the centre of London is a point with which everyone will agree, but next in importance comes the problem of constructing a lot of new roads, or main streets from near the centre of London to the outlying districts, and the construction of the circular road, of which we have often heard. Everyone agrees that this scheme is desirable, but then they are invariably confronted by the enormous expense involved, and the problem of who will pay the piper. Mr. Jeffreys suggests that his central authority should be empowered to levy a rate, but does not directly suggest that the rate should provide the enormous sums which an adequate or even very inadequate Haussmannising of London would involve.

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.



1.—Mr. S. F. Edge (1st Napier) and his Mechanician, Mr. Arthur MacDonald.

2.—Mr. Sidney Girling (1st Wolseley).

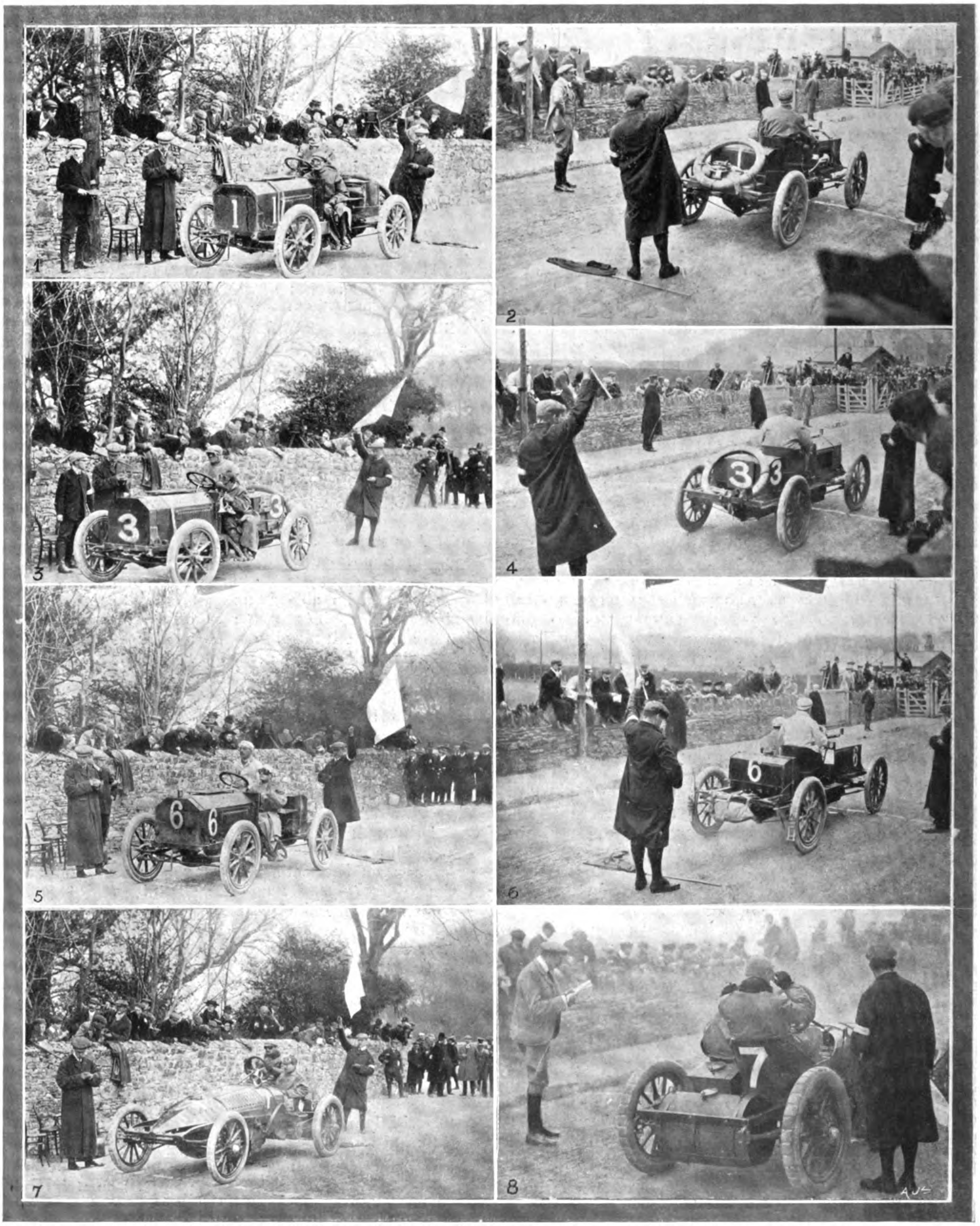
3.—Mr. Charles Jarrott and his Mechanician, Bianchi (2nd Wolseley).

4.—Mr. J. Hargreaves (1st reserve Napier) on right, and Mr. Campbell Muir on the left, who drove one of the Wolseley cars in the tests.

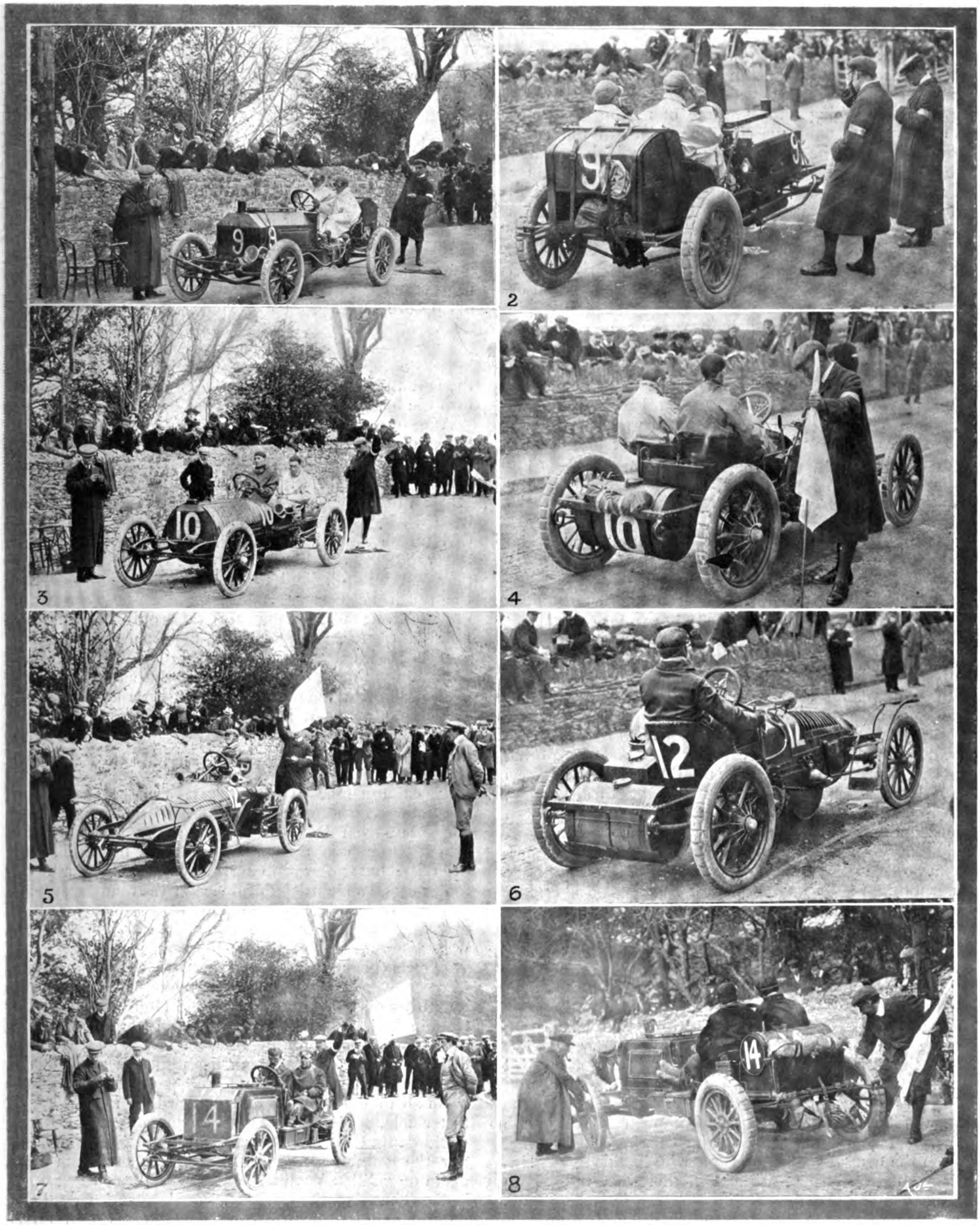
5.—Mr. J. W. Stocks (2nd reserve Napier).

6.—Mr. Clifford Earp, who drove Napier No. 6 excellently throughout the Trials but sustained an unfortunate accident at Douglas on Thursday.

SOME OF THE DRIVERS.



GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—The start of the competitors. Two pictures are given of each car, one from the front the other from behind. Figs. 1, 2, J. W. Stocks (Napier); 3, 4, J. Hargreaves (Napier); 5, 6, Clifford Earp (Napier); 7, 8, Campbell Muir (Wolseley). Major Lindsay Lloyd, with the flag, is one of the starters, the actual sign to move, however, being given by Professor Vernon Boys in the distance, by means of a flag, in order that the respective powers of getting up speed might be tested. Secretary Julian W. Orde is also by the cars Nos. 1 and 7 above, and cars Nos. 12 and 14 on the next page.



GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—The start of the competitors. On the opposite page are given four of the cars starting. Above are four more, again both from in front and from behind. They are:—Figs. 1, 2, S. F. Edge (Napier); 3, 4, Sidney Girling (Wolseley); 5, 6, Charles Jarrott (Wolseley) and 7, 8, Lt.-Col. Mark Mayhew (Napier). Capt. Nugent, one of the judges, is seen in most of the pictures to the left.

THE GORDON-BENNETT BRITISH ELIMINATING TRIALS.

After the strenuous efforts and "crowded life" of Tuesday, the competitors, and those who attended to witness the hill-climbing event at Port-e-Vullin, had comparatively speaking an easy time of it, the event not being timed to commence till three o'clock in the afternoon. Most of the visitors present accordingly travelled from Douglas to Ramsey by train, by tram, or by motor car, with the design of lunching at the Mitre Hotel in that town, which was for the time being the headquarters of the Automobile Club, and subsequently proceeding to the scene of the contest. This resolution, however, was easier to form than to carry out, for the Mitre Hotel was the only place apparently in the whole of Ramsey where adequate refreshment was obtainable, and was in consequence a centre of such absorbing interest that the approaches to it were roped off, and guarded by a stalwart array of constables, who determinedly prevented the access of anybody not provided with, and palpably wearing, badges. Probably there have not been many other occasions when an hotel keeper has been compelled to employ constables to keep intending customers *out of* his establishment. After the luncheon (of those wearing badges) was completed, the waiting crowds were rewarded by the arrival of Stocks on his Napier.

It had been originally, it was understood, the intention to send all the competitors round through Ramsey, but through some alterations in the arrangements most of them took another direction, and Stocks was the only one who turned up to delight the waiting throng. Port-e-Vullin, in a valley at the bottom of the hill up which the competition was to be held, is an attractive spot. The little place itself nestles in a hollow of the hills, bright with the gorse in full blossom, while the grey walls of loose unmortared limestone, which form a feature of the landscape, bring back the wild countryside of the West of Ireland. The wall that ran on either side of the road up Port-e-Vullin Hill was early occupied by a considerable number of spectators, and among them the knights of the camera were even more numerous and more enterprising than usual. A high gorse-covered mound practically formed the grandstand of the occasion, as it commanded an admirable view of the road up the hill, and was evidently looked upon by most of the visitors as the best point of vantage from which to view the event. From the summit of this mound both the starting and finishing points were visible.

The first racing cars to arrive were all Napiers, and, indeed, the only Wolseley to take part in the preliminary run over the course was that driven by Girling, so that some little anxiety was felt by those at the far end lest something should have prevented Jarrott and Campbell Muir from taking part, as it was remembered that Jarrott's change-speed-gear had been damaged before the start of Tuesday's event, while Campbell Muir's clutch had become so worn as to be the cause of his retiring from the contest on that day, after he had completed his first round. Great was the relief, therefore, when both these competitors appeared in time for the first round, as this reduced the absentees to four in number, namely, Mark Mayhew's Napier and the three Darracqs.

Despite the dryness of the weather, and the somewhat loose surface of the road, the dust was not as bad as might have been expected.

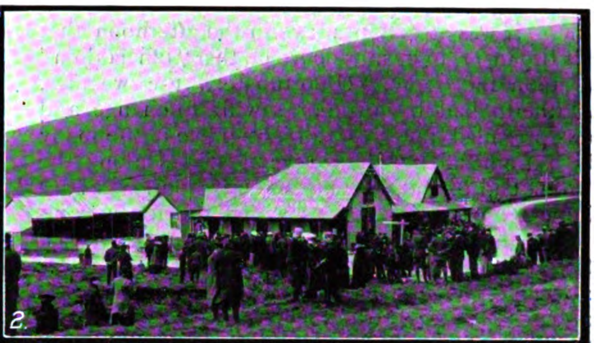
Compared with some of the climbing accomplished *en route* on Tuesday, the hill selected for Wednesday's event could scarcely be considered severe, as it had an average gradient of about only 1 in 17, although, of course, this was not uniform throughout its length; possibly what tried the drivers more than the gradient were the bends which had to be negotiated, as these were just sufficiently severe to necessitate very careful driving.

They added considerably, too, to the interest of the spectators, and excitement grew apace after the warning shout, "Car coming," until it actually shot round the corner into view, and, passing at high speed, disappeared from sight enveloped in a cloud of dust. Such was the scene viewed from the finishing point Shortly after passing, each car met a stretch of quite loose stones, which set up so much noise that many thought the car, then quite invisible through dust, had torn the bank or come to grief itself.

After every car had passed, they all returned again in file, and after reaching the foot of the hill were once more marshalled for their second trial. In all, three rounds were held, and each time Edge came fastest, Earp and Girling doing the next best times. Girling had been driving splendidly throughout the trials, and on this hill he took the bends extremely well. After the last round was finished, everyone, jumping from his perch on the wall, made for the foot of the hill, where the crush became enormous, as may be seen from one of our photographs of this event which we reproduce in this issue; and here a new diversion was afforded. Someone had got into somebody else's garden, and there were visions from the swaying crowd of angry gesticulating females verging on a fight—a most unedifying scene—which all the biassed wisdom of the local "bobby," who most unfairly took the part of she who trespassed, could not obliterate. But such things pass, as did at length the crowd, and some of these, thinking to "steal a march," made for Port Levaigne Station on the tramway, where they were "done" by finding every car full up from Douglas. The country that this line passes through is everywhere superbly beautiful, and even the lucky few who travelled home by road, on motor cars, had less delightful views; the roadway, too, is rather treacherous, and going out to Ramsey that morning one car overturned, and Mr. Pitt, a passenger, was somewhat badly hurt.

Douglas was only reached in time to dress for the dinner given by the club, to which the Governor, members of the Council, and the House of Keys had been invited. During the speeches, which made an item in this most successful function, much was rightly made of the benefits of the Manx legislature, which had for these events wholly read and passed the Bill enabling them all in one day, a feat unheard of in her larger Sister Isle. Hearing these Manxmen speak no one could doubt the keen enthusiasm the trials have evoked, nor the genuineness of their desire to see them held again on "Ellan Vamin."

On Thursday, the last day, Douglas itself had all the sport, for on its promenade were held the Speed Trials forming the final event. Starting from the Broadway and ending near Derby Castle, the kilometre course had two slight curves and tramlines all the way, these latter being so deeply sunk as to render the course hardly an



1.—Watching No. 1 off from the starting line.

3.—Clifford Earp surveys the road on coming to the top of Snaefell.

5.—S. F. Edge coming round the Bungalow Hotel.

7.—Charles Jarrott putting on speed on the straight, past the Bungalow Hotel.

9.—J. W. Stocks after passing the Bungalow Hotel.

2.—The crowd at the Bungalow Hotel watching for the Cars at the top of Snaefell.

4.—Lt.-Col. Mark Mayhew passing the Bungalow Hotel on Snaefell.

6.—Sidney Girling just taking the Bungalow Hotel corner.

8.—J. Hargreaves passes over the Snaefell Electric Railway line at the point where the special subway was made. Note the wheels in the air after bumping on the rails.

10.—Charles Jarrott coming on to the straight past the Bungalow Hotel.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—At the start, and at the "top" of the Island—Snaefell.

ideal one. It was at half past two in the afternoon that the trials began, or, to be more correct, that "officialdom" arrived upon the scene. Unfortunately, the weather, which hitherto had been so fair, saw fit to change and mistiness prevailed, but this did not prevent the many onlookers from taking their several stands along the route, from end to end, at quite an early hour. Besides the Napiers and the Wolseleys which previously competed in the hill climb, a Darracq also came, driven by Mr. Rawlinson, although not his own car, this one being No. 2, which was driven on Tuesday by M. Edmond. As on Tuesday and Wednesday, Mr. Edge delighted everyone by his speed—twice he did the kilometre with a standing start in 39 seconds exactly, which is equivalent to an average speed of over 57 miles an hour. What the maximum speed was in this case it is impossible to say, for the electrical timing apparatus for measuring the speeds over sections of the course was not ready in time for this day's trials.

(1) Edmond, on No. 2 Darracq, arrives at Quarter Bridge late, bringing together officials and others in double quick time, (2) and after creating considerable consternation owing to the noisy and smoky exhaust, (3) is despatched on his way by Mr. Orde and Major Lindsay Lloyd.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.

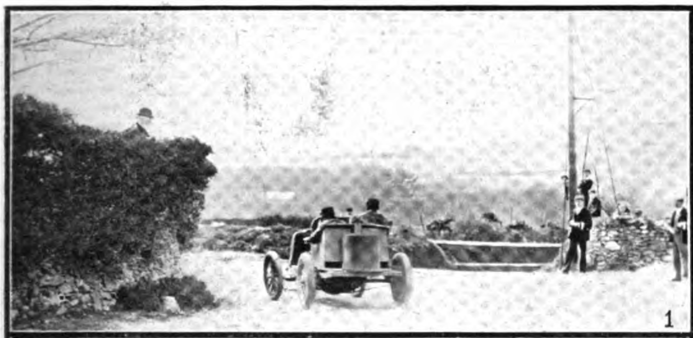
Once again, too, Earp and Girling came along close together; once more Earp showed himself slightly the faster of the two. The programme for the day included three separate trials, under precisely similar conditions, besides the preliminary run over the course; unfortunately, however, the trials came to a premature end owing to an accident which befell Earp just before the commencement of the third round. It had been the custom to allow all the cars, which collected at the far end after each run, to return to the starting point together, and under these circumstances it was not unnatural that some of the competitors should begin to race—much to the delight of the excited onlookers. Although this was not in the programme, it could hardly be regarded as dangerous, considering the reputation of the drivers, though Earp, perhaps a little overcome by the excitement of the moment, carried the race beyond prudent limits, and dashed past the actual starting line at quite an excessive speed. Some sixty yards ahead was a barrier, and behind the barrier a crowd—the sight of which probably brought Earp to a sudden realisation of danger, and without more ado on went his side brakes; being powerful they very soon blocked the rear wheels. The track of Earp's car was exceedingly distinct, and the point at which the rear wheels ceased to revolve remained quite clearly defined, and shows that Earp put on his brakes before he was actually dead straight for the barrier. That part of the road behind the starting post is not quite in line with the course; it is not much out, but sufficient to make a batch of cars steer slightly to the right when entering it together. It is obvious from Earp's track, of part of which we reproduce a photograph, that his wheels were blocked while his car was yet at an angle with the wall. For a considerable distance the car continued her true course, the back wheels jumping clear of the ground every few feet. Further on the track of the back wheels showed decided signs of skidding, and consequently begins to swerve towards the wall which bounds the road on that side. Hitting the wall at an angle, the car was hurled sideways for some 8 or 9 yards, where it came to rest, squarely facing the wall, but a few yards from it. It was apparently this latter movement which threw Earp and his brother from the car. On hitting the wall the bonnet was knocked off, which gave the impression that the car had broken in two. The front wheels and springs were of course smashed, but the rear wheels, save for the fact that one tyre had come partly off the rim, remained intact. Without in any way wishing to draw comparisons, one is struck with the singularly good first racing performance of the Palmer Cord tyres, with which this car was shod. After running on Tuesday and Wednesday without any trouble whatever, they again upheld their new-born reputation during these few seconds of special stress, for it is quite obvious from the track that neither of the rear wheel tyres gave way until after the car hit the wall, and even then one wheel successfully held up after the car had been thrown bodily sideways.

Happily the injuries to both the Earps proved less serious than was anticipated, while a man who was struck by the car appears to have only sustained bruises and fright. It is worthy of note that Mr. V. C. Earp, the driver, is said to have remarked, in speaking of the accident, that he was unable to release his brakes after he had once put them on, owing to a defective catch, which entirely coincides with the deduction made above, for had he been able to have released his brakes he could have steered his car straight. But what might have happened then is an unprofitable reflection in view of what did happen.

During the evening the club announced its official selection of the Gordon-Bennett competitors as follows:—

1st. Edge (Napier).
2nd. Girling (Wolseley).
3rd. Jarrott (Wolseley).

Reserve:—1st. Hargreaves (Napier); 2nd. Stocks (Napier).



1.—Edmond on No. 2 Darracq rounding Willaston Control.

2.—Charles Jarrott on the 90-h.p. Wolseley (No. 12), coming down Brae Hill in Willaston Control.

3.—Clifford Earp on his 65-h.p. Napier running through Willaston Control.

4.—J. W. Stocks on his 55-h.p. Napier taking the hill in Willaston Control.

GORDON-BENNETT BRITISH ELIMINATING TRIALS IN THE ISLE OF MAN.—Willaston Control.

A footnote to the effect that, except for his accident, Earp (Napier) would have been chosen as second in the team, has formed the topic of much heated discussion. Mr. Edge declares that since neither man nor car is a wreck both ought to have their rightful place, and Mr. Edge—ill-advisedly we think—has even threatened to back his contention by withdrawing his name from the selection unless the club rescind their edict.

It is certainly a question which, like many others, has two sides; suppose the doctors declare the driver completely recovered, and the club officials were to find that the car is all right, what effect would this have upon the selection that has been made? It must not be forgotten that the trials, moreover, were held at much expense to prove both man and car; it is far from an unjust supposition that after recovery from such severe contact between man, car, and stone wall, they might, after repair, be even better than before. It is a question, however, for the committee to decide.

The Automobile Club have now revised their calculations relating to the hill climbing event of Wednesday, which had not, of course, been officially checked on that day. It will be observed that the new average times, as published on the next page, do not materially affect the placing of the competitors, except that Girling now appears to have done the smallest fraction better than Earp. No doubt many of our readers will have noticed a discrepancy between Edge's average time and his time per round as published in our columns last week. Unfortunately the error occurred in the post office, which failed to transmit correctly the times for Edge's second and third rounds as telegraphed by our special correspondent.

1.—At the starting point—a scrimmage creates an interlude and proves an irresistible attraction to the crowd.

2.—Campbell Muir on his Wolseley (No. 7) is sent off up the hill.

3.—J. Hargreaves in his Napier (No. 3) taking the first rise. The starting point is immediately round the corner to the left.

4.—Sidney Girling's Wolseley (No. 10) travelling well up the hill.

5.—Campbell Muir on his Wolseley returning to the starting point for the second run up.

6.—The crowd at the finish.

GORDON-BENNETT BRITISH ELIMINATING TRIALS.—Ramsey Hill Speed Trials.

Official Results of the ½-mile Hill Climb up Port-e-Vullin Hill.

No.	Car and Driver.	1st	2nd	3rd	Average.
		secs.	secs.	secs.	secs.
1	Napier (Stocks) ...	57⅖	57⅕	55⅕	56⅗
3	Napier (Hargreaves)	51	52	51	51⅖
6	Napier (Earp) ...	44⅖	42⅘	43⅘	43 10/15
9	Napier (Edge) ...	38⅖	39⅕	39⅗	39
10	Wolseley (Girling) ...	44	44⅗	43	43 13/15
12	Wolseley (Jarrott) ..	47⅖	48⅕	51⅗	49
7	Wolseley (Muir) ...	49⅗	51⅖	50	50⅖

Official Results of the Speed Trials held on Douglas Promenade, on Thursday, May 12th, 1904.

No.	Car and Driver.	1st.	2nd.	Average.
		secs.	secs.	secs.
1	Napier (Stocks)	47⅕	48⅕	47⅘
3	Napier (Hargreaves) ...	49⅗	47⅗	48⅗
6	Napier (Earp)	42	42⅖	42⅕
9	Napier (Edge)	39	39	39
10	Wolseley (Girling)... ...	44⅘	43	43⅘
12	Wolseley (Jarrott)... ...	45⅖	45⅗	45⅗
7	Wolseley (Muir)	47	47	47
2	Darracq (Rawlinson) ...	46⅗	48⅗	47⅗

Now that the trials are over, one cannot help reflecting on their general success. The sightseers had nothing to grumble at—the weather was fine throughout, save for the slight mist on Thursday, and the venues of all the events were admirably adapted to the convenience of the onlooker. Despite the fact that the officials seemed ignorant of their exact duties up to quite a late hour, the organisation was excellent. Although, perhaps, the courses were not ideal ones, there is a feeling of confidence in the results as indicated generally by the trials. Of the Napier team, Edge's performance was magnificent; next to Mark Mayhew's his was the most powerful of the Napier cars, and he used his power to the best advantage. Earp and Hargreaves are both new men, and both did excellently; of the two, Hargreaves is, perhaps, the cooler driver. There is no doubt that Stocks drove well, but his performance is somewhat discounted in appearance by the relatively low power of his car. Mark Mayhew was the most unfortunate of the Napier team on Tuesday, and it was disappointing that he should have been called away from the Island before the Wednesday event.

Nothing but congratulation can be accorded the Wolseley Company for the performance of its cars. Special praise is due to Girling, who so excellently managed the smallest powered of these cars Although Jarrott did well throughout, Campbell Muir was not so successful on Tuesday, but judging by the subsequent performance of his car there does not seem to be much wrong with it.

If these trials showed nothing else, they showed that it is inadvisable to build racers at quite the same rate as Messrs. G. and J. Weir built the Darracq vehicles. It was a plucky attempt, but one would perhaps feel more sorry at their failure had they been more truly English—British-built they were, but of French conception, and even two of the drivers came from across the Channel.

A few further particulars concerning the small breakdowns which occurred to the racers in Tuesday's event have since come to hand:—

We are informed by Mr. S. F. Edge that the conflagration which occurred on his car through the puncturing of the carburettor float, was not of a serious nature, and that it did not affect either of the tyres as was at first reported. Apparently, only two tyre-troubles were experienced by him, in both cases owing to nails in the tyre on the "off side" driving-wheel.

The cause of Mr. Campbell Muir's withdrawal from the trial after the first round was due to a worn-out clutch.

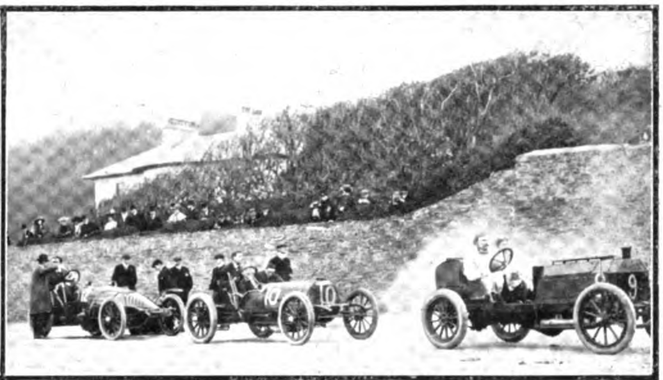
A PROTEST FROM MR. S. F. EDGE.

THE following letter, addressed to the Secretary of the Automobile Club, has been sent to us by Mr. Edge for publication in connection with the decision come to by the Races Committee not to include Mr. Clifford Earp in the team to represent Great Britain for the Cup Race. We deal with this matter elsewhere.

The Secretary,
Automobile Club.

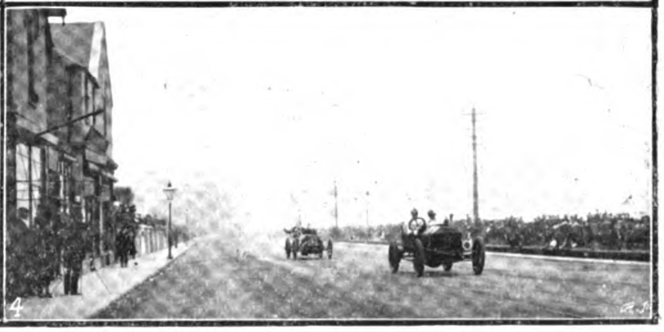
DEAR SIR,—As the Automobile Club have not thought fit to send any official intimation to the individual competitors, or the entrants, of the results of the Gordon-Bennett Eliminating Trials, I can only

1.—Testing the timing arrangements—Prof. Boys in the "Chair."



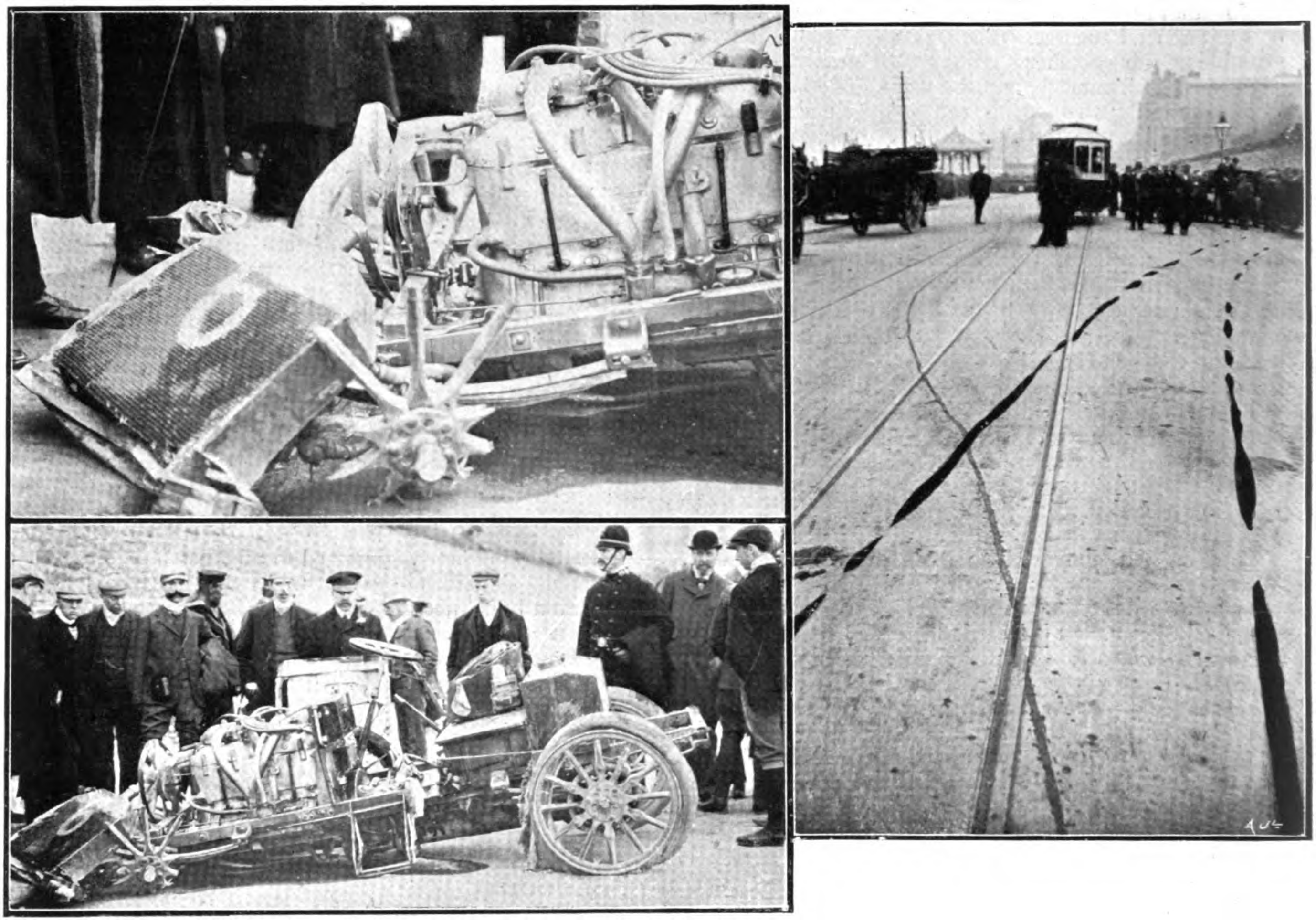
2.—The three chosen cars in their order of choice, viz.: No. 9, S. F. Edge; 10, Sidney Girling; 12, C. Jarrott, waiting their call for the racing.

3.—The Course as seen from the starting point.



4.—Nos. 9 (Napier), and 10 (Wolseley), returning down the course to the starting point for their second run.

Douglas Speed and Acceleration Tests on the Promenade.



GORDON-BENNETT BRITISH ELIMINATING TRIALS.—The regrettable accident to Clifford Earp. In our photographs, taken by our own representative immediately after the accident, is seen the complete car as it finally came to rest, and in the top view it will be observed that beyond the radiator and front wheels, the motor and mechanism appear to be practically intact. In the photo to the right, the peculiar track of the rear wheels after they had been blocked is clearly defined, and it will be noticed that skidding did not begin until the car had travelled a considerable distance. The car finally dashed into the wall near where the crowd is seen gathered round.

assume that the reports in the newspapers and the statement put up in the Peveril Hotel, Douglas, stating the result, is as follows :—

Mr. S. F. Edge	1st
Mr. S. Girling	2nd
Mr. Jarrott	3rd

with Mr. Hargreaves and Mr. Stocks as reserves, is correct, and that Mr. Clifford Earp and his car, which the Races Committee in the same pronouncement indicate were the second best driver and car in the trials, have been omitted because Mr. Earp had a mishap at the close of the trials.

If this notice is correct, I wish you would bring before your committee my very strong protest of such a judgment as being absolutely unfair, and against the best interests of Great Britain winning the Gordon-Bennett race.

The trials were, I understood, held for the purpose of finding out the three best drivers and cars in combination to represent England in the Gordon Bennett Race, and the finding of the committee is that a Napier car, No. 9, driven by myself, is the best combination, and No. 6, driven by Mr. Clifford Earp, second best. This being the case, I fail utterly to see how any subsequent question affects the point at issue, providing Mr. Earp and his car are able to race at Homburg on June 17th, and until the committee have satisfied themselves that he will be unable to do this, my contention is that they are entitled to be second in the British team.

Mr. Earp's car will be on the road again in perfect condition in a few days, and he himself ready to drive it.

There is no doubt that your committee are now aware that the accident to him and his car is comparatively slight.

I trust that your committee will give the most serious consideration to my protest, as Great Britain will have quite hard enough battle to fight without its second best competitor being eliminated through what appears to be a panic decision, which was come to a very short time after Mr. Earp's accident, when the most incorrect reports in regard to his accident were current, and I contend, Sir, that if it is the intention of the Races Committee that the proved best British cars should represent Britain, then Mr. Earp must be included, as he is entitled to by his performance, as the committee themselves admit.

Awaiting your reply.

Yours truly,
S. F. EDGE.

14, New Burlington Street,
May 16th, 1904.

LIKE London, New York held a May Day Parade, but not, however, confined to heavy vehicles. It had been anticipated that 1,000 vehicles would be got together. Steady rain, however, interfered with this estimate. In spite of the very discouraging effects of the elements, 215 machines took part in the parade, of which 142 were pleasure cars and 73 commercial vehicles.

THE WOLSELEY 6-H.P. VOITURETTE.—PART III.

The Change-Speed-Gear and Main Clutch.

THE gear-box and the main clutch are visible in the majority of our illustrations, and the details of their construction are well shown by line drawings in Fig. 9. The gear-box is formed by a single aluminium casting, L, which has a large detachable inspection cover, L^1, that is held down in place by four wing nuts. The box has four projecting lugs cast on it in front, two near the bottom and the other pair on top. The former, L^3, are secured to the crank-chamber casting, B, by a steel bolt, which passes through them and through corresponding lugs, B^3, that project from the crank-chamber. The steel bolt forms a hinge between the gear-box and the crank-chamber, so that the former can be rocked about it for tightening the Renolds silent chain, E^1, which transmits the power from the crank-shaft to the change-speed-gear. The upper lugs on the gear-box are fitted with eye-bolts, L^2, by which they can be securely fixed to the cross-member, A, of the main frame, and by which the tightness of the chain, E^1, can be adjusted when necessary.

The gear-box contains two shafts, K and M, the one mounted immediately above the other, and both are fitted with ball-bearings. The first-motion-shaft, K, projects through the box on the right-hand side, and to its end is fixed the leather-faced cone, E^7, that forms the male member of the main-clutch. The cast-iron clutch-shell, E^4, is rigid with the chain-wheel, E^2, round which the chain, E^1, passes. The wheel, E^2, is the same size as the sprocket, E, and, therefore, the clutch-shell, E^4, at all times revolves at the same speed as the crank-shaft of the engine. The clutch-shell rides freely upon the shaft, and a grease-cup is fitted at its end for forcing grease into this bearing. The clutch-shell is normally forced into engagement with the cone, E^7, by a helical spring, E^{10}, which lies about the shaft inside the chain-wheel, E^2. Between the chain-wheel, E^2, and the shell, E^4, is a thrust-ring, E^3, which is engaged by the forked arms of a bell-crank lever, E^9, and can be caused to slide the clutch-shell, E^4, out of engagement with the cone, E^7, when the clutch-pedal, E^5, is depressed. The bell-crank-lever, E^9, is adjustably connected with the clutch-pedal by the rod, E^8. When the clutch is in engagement, the thrust of the spring, E^{10}, is self contained on the shaft, and when the clutch-pedal is depressed the end-thrust is taken by the ball-bearing, E^6. The clutch is not connected with either the hand or the foot-brakes, so that it is operated entirely independently of them.

The first-motion-shaft is fitted with four spur-wheels, K^1, K^2, K^3, and K^4, which are securely keyed to it. These wheels correspond with the first, second, third, and "reverse" speeds respectively, and the wheel, K^4, is at all times in mesh with an intermediate spur-wheel, K^5, that runs idly in separate bearings in the gear-box. Mounted on the second-motion-shaft, M, is a sleeve, to which are fixed the gear-wheels, M^1, M^2, and M^3, and this sleeve is mounted on feather keys, so that it can slide along the shaft. The sleeve has a groove, M^5, turned in it, and in this groove engages a forked lever, L^5, which is fixed to a sliding rod, L^4, that passes through a stuffing-box in the side of the gear-box. The sliding rod, L^4, is connected by a bell-crank lever, L^6, with the hand-lever, L, at the side of the car, and thus a very direct and simple means is provided for operating the change-speed-gear. In Fig. 9 the gear is shown in its third speed position, the wheels, K^3 and M^3, being in mesh with one another. As the sleeve carrying the wheels is slid along towards the left, the wheel, M^2, engages with the wheel, K^2 giving the second speed, and if moved further, the wheel, M^1, engages with the wheel, K^1, giving the first speed. A further movement of the sleeve brings the wheel, M^1, into a neutral position between the wheels, K^1 and K^5, and finally the wheel, M^1, can be made to mesh with the wheel, K^6, to give the "reverse" speed.

The projecting end of the second-motion-shaft, M, carries the sprocket, N, from which the large roller chain, N^1, passes back to the chain wheel, N^2, which is fixed to the shell, R, of the differential gear on the live axle; the sprocket, N, has eight teeth, and the wheel, N^2, has thirty-one teeth, so that a "gear-down" of about 4 to 1 is obtained. The gear-box is rendered oil-tight and dust proof, and the gear wheels, which are of ample strength for the work which they have to perform, run in grease. Felt washers are fitted outside those ball-bearings through which the shafts project from the gear-box, and these prevent the grease from finding its way out; for emptying the box when necessary, a plug, L^8, is screwed into it at the lowest point. Any of the gear wheels can be replaced separately, and the ends of the shafts which do not emerge through the gear-box have covers fitted over them. The various gears represent speeds of about 7¼, 13⅓, and 20⅔ m.p.h. forward, when the engine is running at its normal speed of 800 r.p.m., so that the car can run at any speed up to about 26 m.p.h. A very efficient transmission of power is obtained between the engine and the road wheels, as there are no bevel wheels, and there is no end thrust on any of the shafts. The hand lever, L^7, is fitted with a plain quadrant having five notches. It is particularly easy to manipulate the change-speed-gear properly owing to the arrangement of the clutch; for in the first place, the first-motion-shaft with its wheels, and the cone, E^7, is comparatively light, and in addition to this both the driving and the driven chain give a certain amount of flexibility.

The Live-Axle.

The back axle is well shown in Figs. 3 and 4, and the details of its construction are given sectionally in Fig. 10. The casting, R, forms the shell of the differential gear, and to this are bolted the chain-ring, N^2, and the brake-drum, P^4. The casting, R, is also rigid with the steel sleeves, R^2, which extend from it on both sides and pass nearly through the hubs of the driving-wheels. The differential gear is of the spur-wheel type, and the differential shafts, R^3, together with their gear-wheels, R^4, are completely enclosed either by the casting, R, the sleeves, R^2, or the hubs. The planet spur-wheels, R^5, are mounted in the usual way on the steel pins, R^6, and the entire axle can be kept full of grease, by introducing it through the screwed plug, R^1. The steel sleeves, R^2, are fitted with ball-bearings, R^7, which are rendered self-aligning by mounting them spherically within the castings, A^2, to which the semi-elliptic side-springs are attached. These ball-bearings are fitted with grease cups on the underside, and the bearings have a ball-race at either end, one inside the casting, A^2, and the other outside it.

The hub of each driving wheel is formed by two castings, R^8 and R^9, the inner of which (R^8) rides freely

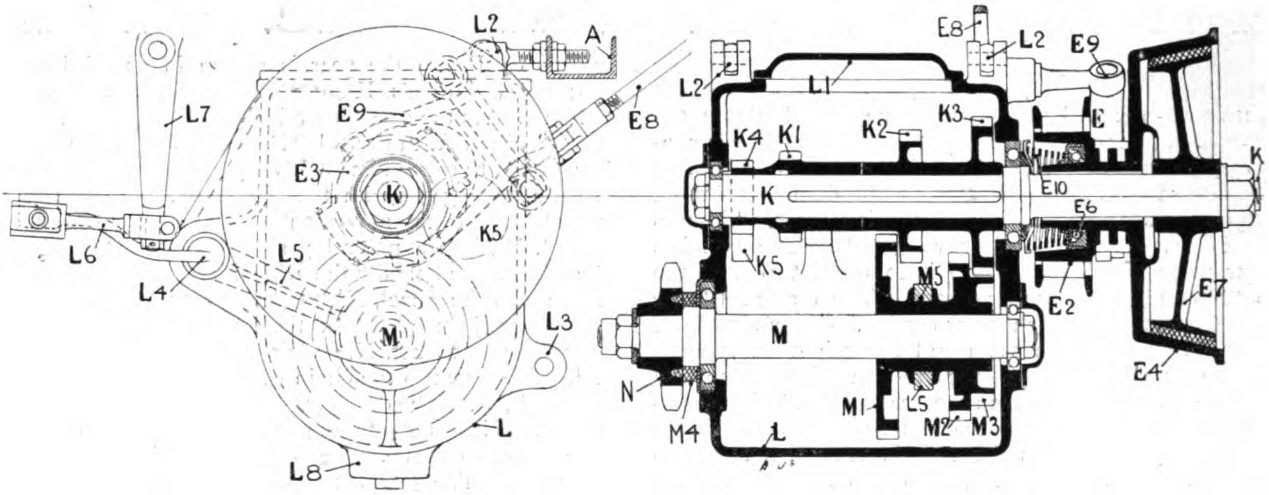


FIG. 9.—Longitudinal and transverse sections of the Wolseley 6-h.p. Gear-Box.

upon the steel sleeve, R^2, to give a long bearing surface for the wheels to run on. This casting, R^8, has the brake-drum, Q^4, bolted to it, and the artillery wheel has its spokes held in place between the castings, R^8 and R^9. The casting, R^9, chiefly serves the duties of a driving carrier, for connecting the differential shaft, R^3, with the road-wheel, and it is for this purpose securely fixed to the end of the shaft. By this construction, the weight of the vehicle is taken by the steel sleeve, R^2, and not by the differential shaft, R^3. It will, of course, be understood that when the car is travelling straight "ahead," its entire axle revolves as one piece in the ball-bearings, and that it is only when turning round a corner that there is any relative motion between the sleeves, R^2, and the differential shafts, R^3, with the castings, R^8 and R^9.

The Controlling Mechanisms.

The steering-gear is of the worm and segment irreversible type and is of very substantial construction. It is provided with a sloping pillar and a large wheel, as seen in our illustrations, and the rods connecting it with the steering heads are arranged as on the majority of large cars.

The foot-brake is operated by the pedal, P, which lies to the left of the steering-pillar, and from it the rod, P^1, passes direct to the brake-band, P^2, that encircles the brake-drum, P^4, on the back-axle. The stationary end of the brake-band is secured to the main-frame by the links, P^3.

The brake-lever, Q, which is fixed beside the driver's seat, and engages with a toothed engaging rack fixed to the body, is mounted on the end of a hollow shaft, Q^1, which passes right across the car and is bent in the neighbourhood of the chain, N^1, so as not to come into contact with it. Through the shaft, Q^1, passes a steel cable, Q^2, which runs over short levers at the ends of the shaft, and connects the two brake-bands, Q^3, together. The brake-bands are supported by brackets, projecting upward from the axle-bearings, and they surround the brake-drums, Q^4, which are fixed to each of the road wheels. The steel cable, Q^2, gives the necessary compensating action between the two side brakes, and the lever, Q, is of such a length that the brakes can be applied with very great power. The ends of the cable, Q^2, are so connected with the brake-bands that any wear that may take place can be compensated for, and these brake-bands, like the brake-band, P^2, on the differential, are so arranged that they act equally well

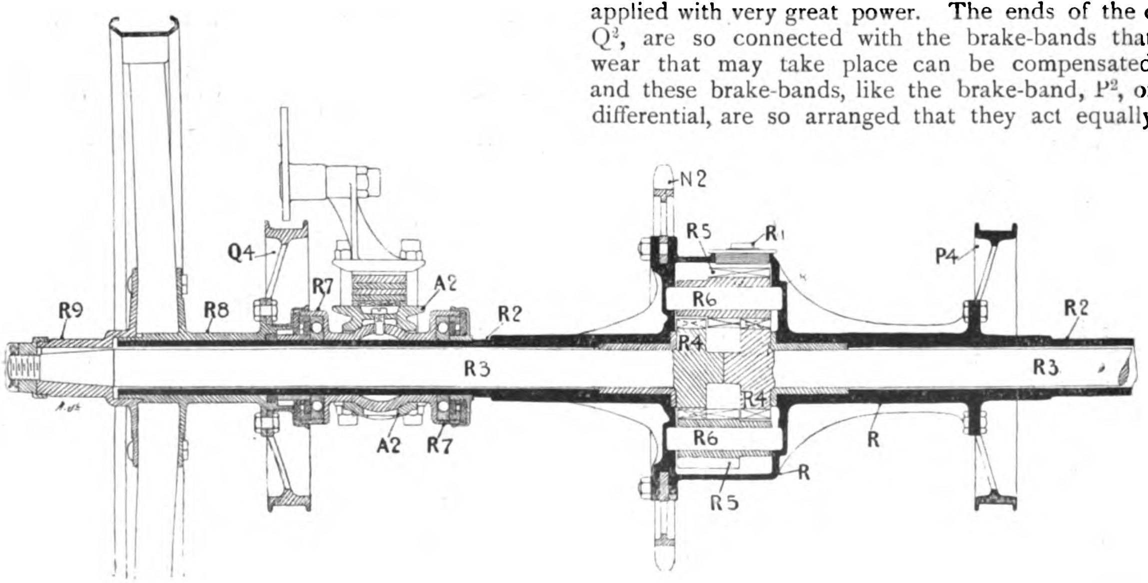


FIG. 10.—Longitudinal section of the Wolseley 6-h.p. Live-axle.

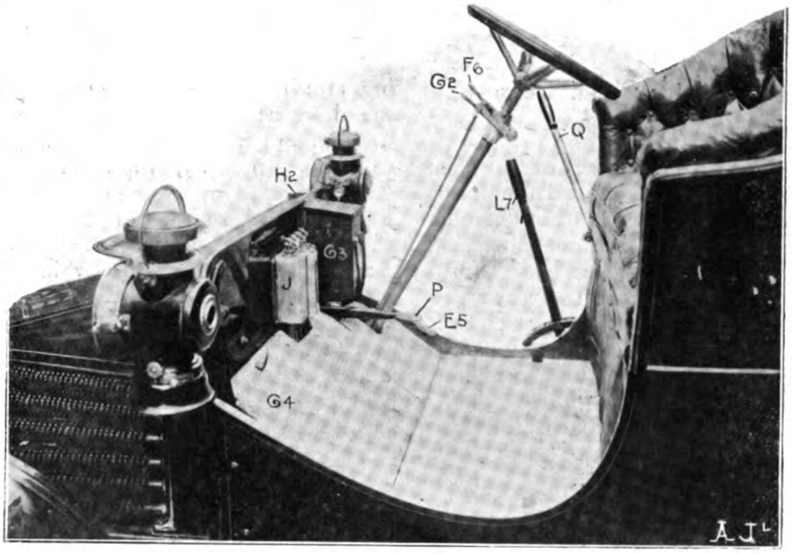


FIG. 11.—View showing the regulating Pedals and Levers, as also the fittings on the Dashboard, on the 6-h.p. Wolseley Voiturette.

whether the car is moving forwards or backwards. The brake-bands are made of steel, and are lined with cotton belting.

The levers and pedals, together with the fittings on the dash, are shown most clearly in Fig. 11, in which the brake-lever, Q, has been moved to its full "on" position to enable it to be seen in the photograph. The change-speed-lever, L^7, is in the first-speed position in this illustration, the neutral notch lying just behind it, and the "reverse" notch behind that. The clutch-pedal, E^5, normally lies on the same level as the brake-pedal, P, but it has been depressed, and held down, in order to render it visible. When driving, the speed of the car is normally varied by operating the small hand-levers, F^6 and G^2, on the steering pillar, the former controlling the throttle-valve, and the latter the time of ignition, as already stated.

The lubricator, J, has four adjustable sight feeds, the pipes from which lead to the main bearings of the crank-shaft, to the big end of the connecting rod, and to the piston, respectively. This lubricator is provided with a gauge-glass by which the level of the oil can at all times be seen, and the filler cap is fitted just above it. Each of the feeds has a quick throw over action for rendering it operative or inoperative, and each of them can be easily adjusted to regulate the rate of flow. The box, G^3, contains the induction coil. The trembler lies just inside the lid and, therefore, it can be got at very easily for adjusting. The switch is fixed to the side of the battery box, beneath the seat. The portion of the floor-board which is marked, G^4, is that by which access can be had to the commutator, the commutator lying immediately beneath it. In the same illustration, too, is seen one of the filler caps, H^2, for the radiator; the other cap is placed in a corresponding position on the other side, but is hidden by the lamp. As we have already said, the engine and the gear-box have a thin metal casing beneath them, so that they are completely enclosed, and that any parts which may inadvertently have been left loose inside the bonnet can only fall into it.

The exhaust-box is not shown in our photograph of the chassis, but the strap, S, by which it is suspended beneath the brake-shaft, Q^1, is visible in several of them. The box itself can also be seen on the complete car in Figs. 1 and 5, where it will be noticed that it lies on the right-hand side between the clutch and the back-axle. The exhaust-pipe is connected by a flange, S^1 (Fig. 4), beneath the cylinder-head, and it passes along inside the metal casing to the silencer. The exhaust-box effectively muffles the noise of the burnt gases, and, considering the high average speed which it is possible to maintain with the vehicle, obviously does not cause any material back pressure.

The complete vehicle, from which some of our illustrations were taken, was recently placed at our disposal for a few days by the Wolseley Company, and we are therefore able to speak from personal experience concerning its capabilities. As already indicated, we formed a very high opinion of its merits, and were particularly struck with the thoroughness displayed both in construction and design throughout. Considering that its engine only has a single cylinder, it is remarkably free from vibration of any kind, and considering the dimensions of that cylinder, the power which is available is almost surprising. With two passengers, it is quite possible on ordinary give-and-take roads to maintain an *average* speed fully up to the legal limit, and it is an unusually steep hill that renders it necessary to employ the lowest of the three speeds that are available. The car is certainly a good hill-climber, and is, moreover, very economical, besides being very cheap.

The Wolseley Company also build the same chassis, with but few alterations, for the Siddeley Autocar Company, and this is sold by the latter Company as the Siddeley Light Car. The chief modification on it is the altered shape of the bonnet and the substitution of a radiator, having vertical Clarkson tubes, for the stepped and finned tubular pattern adopted by the makers on all their touring cars; the radiator forms the front of the bonnet, and externally somewhat resembles a cooler of the honeycomb type.

Roads Improvements Association.—The officers elected for the ensuing year are:—Vice-President, Hon. A. Stanley, M.P.; Chairman, Mr. Robert Todd; Vice-Chairman, Mr. W. Worby Beaumont, M. Inst. C.E.; Hon. Secretary and Acting Hon. Treasurer, Mr. W. Rees Jeffreys. The President of the Board of Trade is being approached by the Association to receive a deputation from the Association, with a view to ensure that action shall be taken, so that in future tramway and light railway authorities shall not be permitted to erect standards in the centre of the roadway, and that before sanctioning new tramways it shall be ascertained that sufficient width of road is provided both for the tramways and the ordinary traffic. We trust they may succeed up to the hilt in their praiseworthy efforts to secure an adequate *quid pro quo* for the Parliamentary privileges granted to the ever-spreading tramway companies' systems.

THE HUTTON PETROL CAR.

(*Concluded.*)

The Barber Gradually-Variable Speed Gear.—Part III.

THE speed at which the free-wheel clutches cause each of the clutch-rings to revolve does not depend upon the number of impulses that are given to it by them but upon the velocity of the clutches at the moments that they are driving it, and therefore, as we have before said, it is by no means easy to calculate the gear ratio of the mechanism for different degrees of eccentricity of the eccentric. This difficulty is chiefly caused by the fact that the right-handed clutches never attain so high a velocity during their working strokes as do the left-handed clutches during their working strokes, and the calculation is further complicated by the lack of absolute synchronism in the action of the oppositely working clutches. It is, however, quite possible to work out the mean working velocity of all the clutches, and this practically gives the gear ratio for full load.

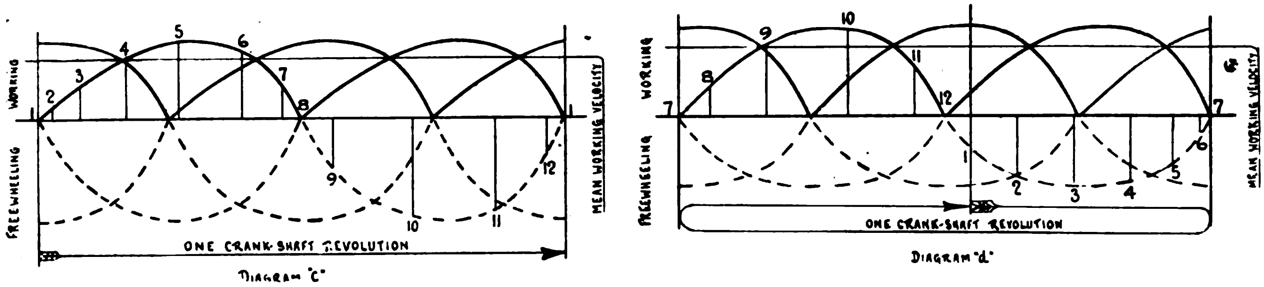


FIG. 29.—Diagrams illustrating the action of the Barber Gear. Diagram *c* represents the superimposed velocity curves of the four right-hand clutches during their working and their free-wheeling strokes, for one revolution of the main-shaft; the numbers correspond with those on diagram *a*. Diagram *d* gives corresponding velocity curves for the left-hand clutches during two consecutive half-revolutions of the main-shaft, and the numbers correspond with those on diagram *b*.

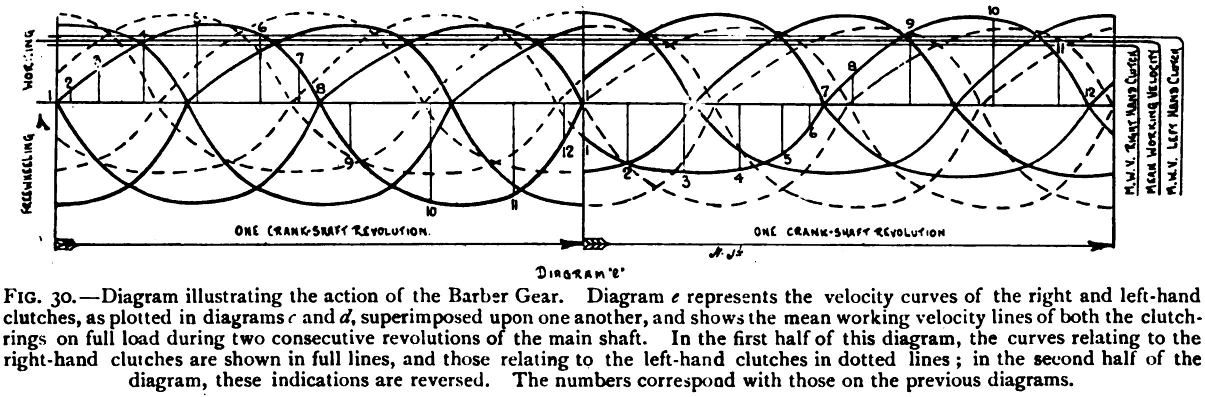
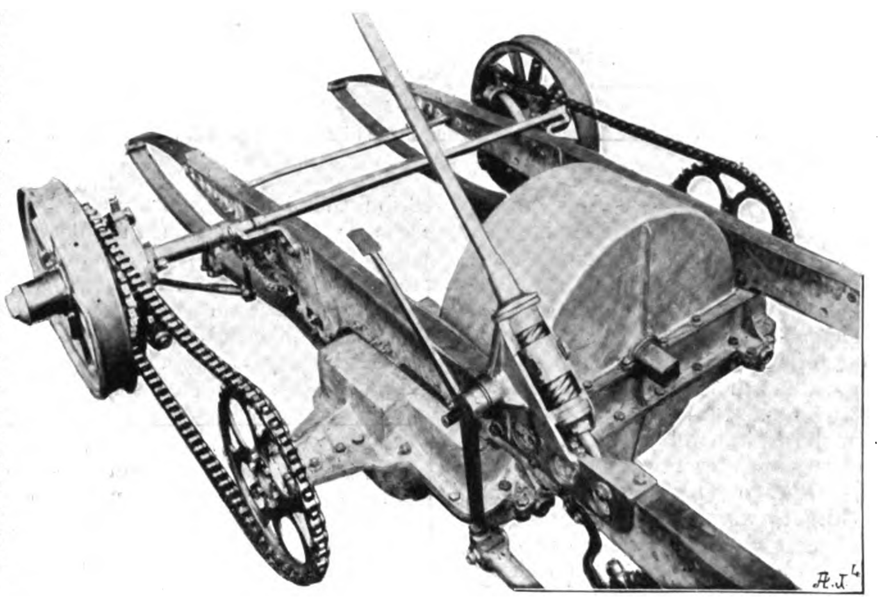


FIG. 30.—Diagram illustrating the action of the Barber Gear. Diagram *e* represents the velocity curves of the right and left-hand clutches, as plotted in diagrams *c* and *d*, superimposed upon one another, and shows the mean working velocity lines of both the clutch-rings on full load during two consecutive revolutions of the main shaft. In the first half of this diagram, the curves relating to the right-hand clutches are shown in full lines, and those relating to the left-hand clutches in dotted lines; in the second half of the diagram, these indications are reversed. The numbers correspond with those on the previous diagrams.

As a matter of fact, with the Barber gear, a continuous drive is given by the clutches to the clutch-rings, except on comparatively light loads, and curiously enough, its irregularities in the moment of travel and in velocity of the right and left-handed clutches very nearly compensate one another, and, together, have the effect of greatly reducing the work of the hydraulic cushion that enables a continuous drive—instead of merely a series of impulses—to be given to the clutch-rings. For this reason it will be found that the Barber gear is singularly free from the objectionable features that have hitherto rendered all other gears of this kind open to a greater or less amount of adverse criticism; in it the clutch rings—except on light load—are driven with a steady continuous pressure by the clutches, one pair of clutches taking up the drive at the instant that the previous pair cease driving, and, although it would require a lengthy analysis to explain precisely why it should be so, the eccentric strap does not revolve about the eccentric sheave when the left and right-hand clutch-rings are allowed to revolve at the same speed as one another, *i.e.*, except when the car to which the gear is attached is turning round a corner. These all-important characteristics of the Barber gear reduce the amount of idle work which is done inside the mechanism to such an extent that when it is working normally there are only two vibratory motions taking place, the one of the hydraulic cushion and the other of the eccentric strap. The former consists of a slight to and fro movement of the piston, G^4, in the hydraulic cylinder, G^3, and the latter of the eccentric strap, H^1, backwards and forwards around the eccentric sheave, H, relatively to the stationary portions of the gear. Neither of these movements, however, are anything like as great as would at first be anticipated, because the very convenient compensating effect, to which we have already referred, steps in, with the result that the various irregular motions nearly neutralise one another. It is only, however, by very careful study of this somewhat complicated problem that the reasons for the facts we have just mentioned can be clearly seen, and as also it would take up a considerable amount of our space to enter into the question really thoroughly, we do not propose—having now stated these all-important facts—to more than consider briefly the main points involved, and thus we shall be able to do with the assistance of the further diagrams which we give this week.

The diagrams *c* and *d*, Fig. 29, represent the velocity curves of the right- and left-hand clutches respectively, during one complete revolution of the shaft, G.

In these diagrams the working strokes of the four clutches are represented by the curves shown in full lines above the neutral line, and the free-wheeling strokes of the same clutches by the dotted lines beneath. The distance of the curves at any point from the neutral line indicate the velocity of that particular clutch at that time, and the numbers which are marked on each diagram along the curve of one clutch correspond with the numbers on diagrams *a* and *b*. Were it not for the hydraulic cushion, the clutch-rings would have to be driven by the clutches only at those instants that maximum clutch velocity had been attained, that is to say, the right-hand clutches would only drive their clutch-ring at the point marked 5 in diagram *c*, and the left-hand clutches about midway between the points marked 9 and 10 on diagram *d*. The inertia of the car, however, and of the clutch-rings themselves which drive it, would render propulsion by a series of impulses in this way very unsatisfactory, for, as indicated previously, it would be impossible to construct suitable clutches that would withstand the shocks imposed upon them. The effect of the hydraulic cushion is to reduce the velocity of the clutches, as soon as the power that they are transmitting reaches a certain amount, and it will therefore be seen that on full load their velocity during their working strokes could be made to never exceed that indicated on the diagrams by the lines marked "mean working velocity," as indeed it is.



The 100-h.p. Barber Gear on a partly finished Hutton Racer.

This reduction in velocity is brought about by the piston, G^4, receding momentarily into the hydraulic cylinder, C^3, and emerging to the same extent again during the operative travel of each clutch, and it is the resistance to the thrust of the eccentric strap that forces the piston, G^4, inwards, and this resistance naturally increases with the load.

In actual practice this is just what occurs, and therefore the clutches, one after the other, come into operation and drive their clutch-rings, applying to it a continuous rotary "torque," in which the intermittent impulses are completely converted into a continuous drive.

It will, of course, be understood that the Barber gear at all times forms a free-wheel mechanism that permits the car to travel faster than the engine is trying to drive it, and that there are times at which only more or less intermittent impulses are transmitted to the driving wheels through the gear. After the car has been "coasting," for instance, and has slowed down sufficiently for the engine to again drive it, a series of momentary impulses will at first be given to the clutch-rings by the clutches, and these impulses will gradually become of longer duration as the speed of the car is still further reduced, until ultimately, when the load is sufficient on the engine, the impulses of the clutches will become continuous, and during their working strokes they will travel at the "mean working velocity."

It is from this point of view that the actual gear-ratio, even for one set of clutches, for any degree of eccentricity is incalculable with any degree of accuracy, and over and above this it should be pointed out that although the true gear-ratio may be considered as that which the gear is shown to give on full load in Fig. 29, yet, under certain conditions, the hydraulic cushion is capable, on extreme loads, of still further flattening the velocity curves (diagrams *c* and *d*), with the result that the mean velocity line through their points of intersection is lowered, and consequently the gear-ratio is further reduced. It will be seen by comparing diagrams *c* and *d*, that the velocity curves for the right and left-hand clutches differ from one another considerably, and that the "mean working velocity" lines are at different heights above the neutral line. The cause for this difference in the two sets of curves has already been explained by us, and may be regarded as the result of the fact that the shaft, G, revolves in the same direction as the clutch-ring casting, J^1, but in the opposite direction to the clutch-ring casting, J^2. It will of course be understood also (1) that only one of the four right-hand clutches, and one of the four left-hand clutches, can be actually working at the same moment (2) that it is necessary for a left-hand clutch to be driving at the same time as a right-hand clutch, in order that either should do useful work, and (3) that the left and right-hand clutches, which are operating simultaneously at any moment, are connected to opposite lugs on the eccentric-strap.

The net result of the action of all the clutches on the clutch-rings is conveniently shown in diagram *e*, Fig. 30, where the velocity curves of the right-hand clutches (drawn in full lines) are superimposed upon the velocity curves of the left-hand clutches (shown in dotted lines) for one revolution of the crank-shaft of the engine, and the left-hand velocity curves (in full lines) are superimposed upon the right-hand curves (in dotted lines) for a second revolution of the crank-shaft. The curves above the neutral line represent the working strokes of the clutches, and those below this line represent their free-wheel strokes. In this diagram the normal working velocities for each set of clutches are drawn right across the diagram, and between them is a third line which indicates the mean of all the clutches, and may approximately be taken to represent the velocity of the clutch-rings when the gear is in its top speed positions and the engine is working at full load. This diagram clearly shows the extent to which the right-hand clutches lie out of synchronism with the left-hand clutches, and it will readily be understood that since the left-hand clutch has a slight lead, therefore there is a tendency for the eccentric-strap, H^1, to turn in a clockwise direction about the eccentric-sheave until the corresponding right-hand clutch has obtained a grip of its clutch-ring. The velocity of the left-hand clutches being greater than that of the right-hand clutches would also tend to give a rotary motion, in the same direction, to the eccentric-strap. On the other hand, however, the inward movement of the piston, G^4, into the hydraulic cylinder, G^3, for cushioning the clutches, tends to turn the eccentric-ring, H^1, about the sheave, H, in the opposite direction, because it has considerably more retarding effect upon the working left-hand clutch than upon the working right-hand clutch, and there is also a tendency for the eccentric-strap to be turned in this same (counter clockwise) direction by the right-hand clutches, which continue their working strokes after the left-hand ones have finished. As a matter of fact, of course, both right- and left-hand clutches work continuously under normal conditions, so that there would be no rocking motion imparted to the eccentric strap owing to lack of synchronism, except on very light loads, and therefore such rocking motion as is given to it results from the differences of velocity between the left- and right-hand clutches on the one hand, and the unequal effect which the hydraulic cushion has upon these differential clutches on the other hand. The rocking motion of the eccentric strap, H^1, and the reciprocating motion of the hydraulic piston, G^4, are intimately connected with one another, and they mutually reduce the extent to which they would otherwise have to act by balancing up the various compensating duties that each would otherwise have to perform separately. This is the explanation of the unexpected phenomenon which is encountered when studying the Barber gear—that the eccentric strap, H^1, normally merely gyrates, but does not revolve, and that the hydraulic piston, G^4, travels backwards and forwards over a much smaller path than would at first be expected. It may assist those of our readers who wish to understand this point in greater detail than the space at our disposal permits us to enter into, if we point out that it is the left-hand clutches when working which tend to force the piston, G^4, into the hydraulic cylinder, G^3, whilst the right-hand clutches when actually working are having an opposite effect upon it. The inward cushioning movement of the piston, G^4, rather tends in consequence to accelerate the right-hand clutches, so far as its actual inward motion is concerned, although the effect of its having moved inward is to reduce the velocity of all the clutches, whereas this inward movement itself has the opposite effect upon the left-hand clutches, as the hydraulic piston moves outwardly again, the reverse effect, of course, is met with, but the position in which the parts then are renders it less.

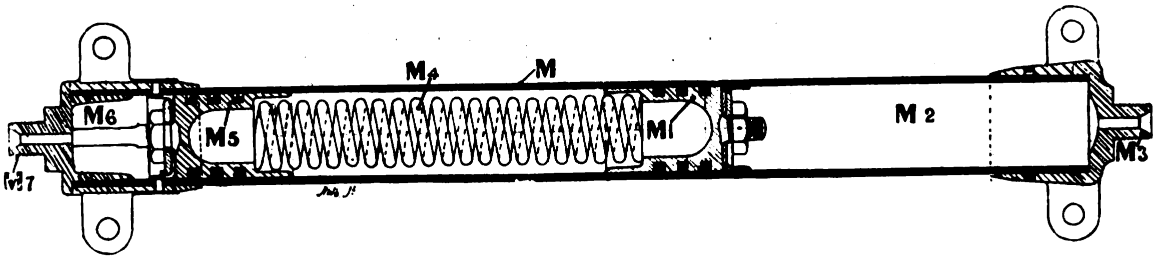


FIG. 31.—Section of the hydraulic accumulator that is used in conjunction with the Barber Gear.

From the above consideration of the operation of the Barber gear, it will be clearly seen why the paths of the lugs, H^4, are not true circles in practice, even though the eccentric strap, H^1, does not itself revolve. Not only does the hydraulic cushion tend to flatten the upper and lower sides of the circles, h^1, h^2, h^3, h^4, shown in Fig. 28, but the vibratory and partial rotary movement of the eccentric strap widens out the sides of these circles. The actual paths are by no means easy to determine accurately, and we have, therefore, not attempted to show them in our diagrams. It is probable that the shape of the paths, unlike those indicated in Fig. 28, is such that the dead centres between the working strokes of the left and right-hand clutches are coincident.

	The Hydraulic Accumulator.
M	Cylindrical chamber.
M^1	Accumulator piston.
M^2	Oil under pressure.
M^3	Inlet from force-pump.
M^4	Helical spring.
M^5	Cushion-piston for gear.
M^6	Oil space.
M^7	Pipe connection to gear-ram.
	The Transmission Gear.
N	Near-side lay-shaft.
N^1	Off-side lay-shaft.
N^2	Sliding spur-wheel on shaft, N.
N^3	Sliding spur-wheels on shaft, N^1.
N^4	Bevel gears.
N^5	Sprocket shafts driving side-chains.
	Diagrams of Gear.
g^1 g^2 g^3 g^4	Working periods of shaft, G, for the respective clutches.
h	Path of the centre of the brake-sheave, H.
h^1 h^2 h^3 h^4	Paths of the centres of the respective lugs, H^4.
l^1 l^2 l^3 l^4	Paths of the respective clutches.

Table of Reference Letters for Figs. 26 to 31 inclusive.

The photographs of the gear and its parts which accompany this article were taken from one of the 100-h.p. change-speed-gears which were built for a Hutton racing car, but the gear used on the 20-h.p. Hutton cars is identical in every respect although smaller. On the large gear the relative speed of the engine and of the clutch-rings, on the top gear and with full load, is about 9 to 1, and on the 20-h.p. model this ratio is about 11 to 1. With so large a reduction of speed in the variable speed-gear itself it is, of course, necessary to gear up again afterwards, and this is done between the large spur-wheel castings, J^1 and J^2, and the smaller spur-wheels on the lay shafts, N and N^1. This of course involves the usual transmission losses that are unavoidable on chain-driven cars as now made, but the

Barber gear itself has been found to be remarkably efficient in itself.

From a constructional point of view the Barber gear is by no means complicated in comparison with other change-speed mechanisms now in use, although at first sight the impression may be conveyed that it is so. The majority of the parts can be cheaply turned out by automatic machinery, and after they leave the machine tool there is practically no hand fitting necessary when assembling them. The castings used throughout are made of steel, and all the forgings, including the main shaft, the hollow fulcrum pins, and the connecting links are made of nickel steel. The cup on the base of the hydraulic piston, G^4, is made of spun brass, for a very interesting phenomenon was met with when using leather for this purpose originally. Extraordinary as it may seem at first sight, it was found that the cup leathers very soon *burnt* out, the reason being that what little air remained in the hydraulic cylinder, G^3, was able to give up heat to the leather when compressed, and allowed to expand constantly by the vibrating piston; the leather being a non-conductor was unable to give up the heat to the piston, and therefore became charred.

The Barber Hydraulic System.

It has already been explained that the Barber variable speed-gear and the hand-controlled brakes on the Hutton car are operated by oil under pressure that is continually forced by the engine into an hydraulic accumulator on the dash. The accumulator itself is shown sectionally in Fig. 31, where it will be noticed that it consists of a long cylinder, M, containing two pistons, M^1 and M^5, with a strong spring, M^4, between them. The spring, M^4, is of considerable length, so that the piston, M^1, which compresses it can travel a considerable distance in the cylinder while doing so. The pipe from the oil-pump, which it will be remembered is driven by an eccentric off the spindle of the magneto, is connected to the casting, M^3, which forms the one end of the accumulator, and the oil is forced through it into the space, M^2, behind the piston, M^1. The entering oil forces the piston, M^1, along, compressing the piston, M^4, until a certain degree of pressure has been attained, and then a relief valve, which is not shown in Fig. 31, comes into operation, and allows any further oil that is delivered by the pump to pass back again to the suction side of it. A branch pipe in the delivery pipe is led to the valves that control the passage of the oil to the gear, and to the brake cylinders, and the hydraulic accumulator stores sufficient oil under pressure to fill the hydraulic rams in these mechanisms.

The piston, M^5, is fitted in the accumulator cylinder, M, and a pipe connection, M^7, is provided in the casting forming in order to form the necessary flexible cushion for the hydraulic ram inside the variable-speed-gear. The space, M^6, behind it is in open communication at all times through a pipe that fits at M^7 on this end of the accumulator with the pipe, G^8 (Figs. 22, 26, and 27), that conducts the oil to the gear, and thus the same spring, M^4, is made use of for the cushion piston, M^5, as for the accumulator piston, M^1. The piston, M^5, maintains an approximately constant pressure on the piston, G^4, inside the gear, and it vibrates in synchronism with the piston, G^4.

The levers controlling the hydraulic system on the Hutton cars, which are fitted above the steering wheel, are shown, together with their quadrant plate, in Fig. 32. The lever on the right is connected with the two valves by which oil is admitted to the brake cylinders, or is allowed to flow back from them to the oil tank respectively, and is so arranged that it normally stands in a central position between those marked "on" and "off." When pressed forward oil is admitted to the brake cylinders, and if allowed to return to its central position the oil is still retained in them. If drawn towards the driver, the oil is allowed to escape from the cylinders, and the brakes are consequently drawn off by their springs, as already explained in a recent issue.

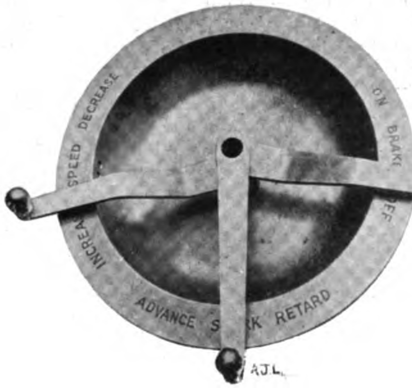


Fig. 32.—View of the controlling hand-levers, above the steering-wheel, on the Hutton Car.

The lever on the left is arranged in a similar manner in relationship to the valves admitting oil, and allowing it to escape from the hydraulic cylinder in the variable-speed-gear. When pressed forward it effects a reduction in the speed of the car by allowing some of the oil to flow back to the supply tank, and when drawn towards the driver it increases the speed of the car by admitting more oil to the hydraulic ram. The third lever in our illustration is mechanically connected with the timing-gear on the engine in much the usual way. It will thus be seen that the entire control of the Hutton car can be effected by these three hand-levers, and that, therefore, practically no expenditure of physical effort is needed to drive the car.

E. J. PENNINGTON has again come to the end of another of his wonderful schemes in America. By way of exploiting the guileless public he started a stock-jobbing enterprise, entitled the Cleveland Motor Company, and to this concern a Receiver has now been appointed. Besides a wonderful "automobile horse," the main bait was an alleged 300-h.p. automobile, containing sleeping apartments and every appointment of a first-class residence. When the "construction" of this remarkable machine failed to attract, it was then widely reported to have been sold for 35,000 dols. to a millionaire, but apparently even this rûse has exhausted itself, judging by the proceedings, which have resulted in a Receiver being appointed. Possibly Mr. Pennington may now have time to run over to England, and help *some* of the old friends with whom he was associated in the early days of automobilism in this country.

'INTERNAL COMBUSTION MOTORS."

By Dugald Clerk, M. Inst. C.E.*—(*Continued*).

MR. DUGALD CLERK then laid great emphasis upon the fact that considerably more information is required in order to formulate a really accurate standard engine for comparison. He thought that the first question which must be definitely settled is that of the specific heat of air and of the various gases that enter into the chemical action of combustion at various temperatures between 500° C. and 2,000° C., although four distinguished French physicists, MM. Mallard, Le Chatelier, Bethelot, and Vieille, have attempted to obtain values of these specific heats by following the lines suggested by Bunsen, yet he considered that no satisfactory determinations were as yet available. Their experiments were based on the assumption that combustion was complete at maximum temperature, and came to the conclusion that the specific heat of the gases tested—oxygen, nitrogen, carbonic acid, steam, and other gases—had greatly increased at high temperatures. In Mr. Clerk's opinion, the conclusions are vitiated by the supposition that any mathematical examination of lines of cooling could determine whether combustion was complete or not. In support of this statement, he referred to experiments which he had himself made in this direction, stating that they showed that combustion was not complete at the time assumed by those gentlemen. In support of his contention, Mr. Clerk showed curves made from his experiments upon London coal-gas, from which it is evident that heat is added subsequently to maximum temperature, for with mixtures of different richness cooling does not take place at equal rates, but is more rapid the richer it is over a certain range. He pointed out, too, that it is well known in gas engine practice that with a weak mixture, even when fired quite at the beginning of the stroke, a high expansion line is obtained, thus proving that heat is added during expansion.

He then pointed out that physicists would do a great service to gas engineers if they would determine the specific heat of various gases at these high temperatures by some methods which do not involve combustion, and he then suggested several such methods which might be profitably employed. The most obvious, he thought, would be to compress the gas that was to be tested in a water-jacketed pump cylinder operating on the four-stroke cycle, compressing it to a high degree, expanding it, and then rejecting it. The heat-flow could be accurately measured and compared with the compression and expansion curves. A high temperature could easily be obtained, and the heat added would be measured by the mechanical work done upon the gas. Another method would be to heat air electrically by incandescent wires at constant pressure, keeping up a flow past the wires, measuring the temperature of the air when incandescent, and absorbing the heat in a calorimeter. Yet another method which he suggested, and had been attempted by him, was to produce a gaseous explosion to liberate the pressure very rapidly through wire gauze to a vacuous vessel, measure the inflammable gas not burned, and estimate for any given period of explosion the amount of heat evolved at a given point. All such experiments, however, are troublesome and expensive, and would involve several years' work, but apart from their great practical value in connection with internal combustion engine progress, their scientific interest alone would be considerable.

Table VII.—Relative Volumes of Combustible Mixtures with Oxygen and Products of Combustion.

8 vols.	2 vols. Ethylene C_2H_4 + 6 vols. O	gives	8 vols.	4 vols. CO_2 + 4 vols. H_2O
14 vols.	2 vols. Butylene C_4H_8 + 12 vols. O	,,	16 vols.	8 vols. CO_2 + 8 vols. H_2O
17 vols.	2 vols. Amylene C_5H_{10} + 15 vols. O	,,	20 vols.	10 vols. CO_2 + 10 vols. H_2O
18 vols.	2 vols. Pentane C_5H_{12} + 16 vols. O	,,	20 vols.	10 vols. CO_2 + 10 vols. H_2O
24 vols.	2 vols. Heptane C_7H_{16} + 22 vols. O	,,	30 vols.	14 vols. CO_2 + 16 vols. H_2O
27 vols.	2 vols. Octane C_8H_{18} + 25 vols. O	,,	34 vols.	16 vols. CO_2 + 18 vols. H_2O
8 vols.	2 vols. Alcohol C_2H_6O + 6 vols. O	,,	10 vols.	4 vols. CO_2 + 6 vols. H_2O
7 vols.	2 vols. Acetylene C_2H_2 + 5 vols. O	,,	6 vols.	4 vols. CO_2 + 2 vols. H_2O

Speaking next concerning the maximum temperatures of gaseous explosions, he pointed out the determination of these depends greatly on the knowledge of the chemical actions that are taking place, and that these are of a very complicated nature. It is necessary, for instance, to consider the particular fuel employed and especially the atomic and molecular volume of the materials entering into the chemical action both before and after combustion. It is known that with complete combustion a maximum explosive mixture of hydrogen and oxygen, or carbonic oxide and oxygen contracts one-third in passing from the uncombined state to the compounds, and that where these substances exist in moderate amount, and where air supplies the oxygen, the contraction after complete combustion amounts to about two or three per cent. With other gases, however, the contraction may be considerably greater and in the case of certain hydrocarbons, molecular expansions instead of contractions are found to occur. These variations in volume, before and after combustion for various fuels, are given in Table VII.

It will, therefore, be seen that it is necessary to examine carefully such change of molecular volume before the temperature can be estimated, either from an indicator diagram taken from an engine or from results of explosion in a closed vessel, and even then the determination of temperature from changes of pressure would involve the knowledge as to whether combustion were complete or not.

Mr. Dugald Clerk next emphasised the fact that it is necessary to know the real actions occurring in gaseous explosions, and the proportion of combustion that occurs at different stages of the explosions. This raises a further question when calculating the heat added at constant volume, because combustion at once changes the chemical substances present into other compounds, and it is, in consequence, difficult to know which specific heat should be taken. For this reason we cannot now say how much heat has been added at the minimum volume and how much during expansion, although it appears evident that heat is in many cases added during expansion.

In concluding this recital of the facts which the engineer requires to know before the properties of an accurate standard engine comparison can be formulated, Mr. Clerk mentioned that a closer assumption than he had made by comparing the gas engine with the air engine standard, based on the data that the ratio of specific heat at constant volume to specific heat at constant pressure is in many gas-engine mixtures 1 to 1·38 before explosion, and 1 to 1·37 after explosion, were the efficiency values given in Table VIII., which had been calculated by him from these constants—values, which are slightly lower than those for pure air.

Table VIII.—Values of E for $\gamma = 1{\cdot}37$ and for $\gamma = 1{\cdot}38$.

$\frac{1}{r}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{7}$	$\frac{1}{10}$	$\frac{1}{20}$	$\frac{1}{100}$
$E = 1 - \left(\frac{1}{r}\right)^{0.37}$	0·23	0·334	0·401	0·449	0·513	0·573	0·67	0·818
$E = 1 - \left(\frac{1}{r}\right)^{0.38}$	0·231	0·341	0·409	0·457	0·523	0·583	0·680	0·826

He had also calculated the efficiency of two assumed cases of air standard engines where expansion and compression are both adiabatic, but where the adiabatic compression follows the curve $PV^{1.38}$ = constant, and the adiabatic expansion is $PV^{1.36}$. Where the maximum temperature is 1,600° and the suction temperature 100° C. the efficiency is 0·446. If specific heat at constant pressure be taken as 264·5-ft.-lbs., $\frac{1}{r} = \frac{1}{5}$. If the specific heat be taken as 252·4 under the same circumstances, then the efficiency becomes 0·467.

In the case where expansion is $PV^{1.37}$, compression $PV^{1.38}$, $\frac{1}{r} = \frac{1}{5}$, specific heat of constant volume 264·5-ft.-lbs. between 1,600° C. and 100° C., and then E is equal to 0·441. Here, in both these cases, which closely resemble practical cases, the deviation from standard is not great.

From the foregoing consideration of the simplified standard engine of comparison, Mr. Clerk pointed out that the lessons were very clear, and that amongst all uncertainties, constructors have particularly noted that the economy of an engine increases as the compression space is reduced relatively to the cylinder volume. He mentioned, however, that there was another direction in which improvement was also possible, viz., to reduce the heat losses to the greatest extent. The difficulty of doing so was that there are many contradictory requirements in the practical cycle, for the charge must be as cold as possible, the compression should not be accompanied with heat-loss or gain, and the expansion following the high temperature combustion should also take place without heat-loss or gain. Such very brief periods of time are available for the various operations that it is almost impossible to minimise the heat-flow, although it naturally becomes less as the dimensions of the engine are increased. Although the larger engines ought relatively to lose less heat, and this is so up to a certain point, yet there is a limit beyond which reduction of cooling surface can be carried too far, for then the products of the previous combustion, if not entirely removed, are apt to cause pre-ignition to occur if high compression is employed. Unfortunately no exact knowledge exists as to the temperature of ignition of different gaseous mixtures, and therefore in practice, the maximum safe degree of compression is usually determined experimentally. It is found that gases which are rich in hydrogen are as a rule apt to pre-ignite more readily, and that in petrol engines a higher compression can be employed than with engines using a heavier oil. It also appears that with alcohol the compression can be considerably higher than with petrol.

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* The "James Forrest" Lecture, 1904, read before the Institution of Civil Engineers, on April 21st.

Concerning the chief causes, so far as construction is concerned, that limit high compressions in the matter of pre-ignition, he mentioned that the presence of a small incandescent portion of metal in the cylinder, a porous surface of the metal, a hot piston, an overheated exhaust valve and carbon-deposit in the cylinder, were frequently responsible. As instances showing that the reduction of cooling surface can be carried too far, he referred to cases of large engines in which the surfaces had been deliberately increased by the designers, in order to ensure smooth running, even at the sacrifice of highest theoretical efficiency. Amongst these is the "Deutz" engine, a section of the combustion chamber of which is shown in Fig. 1. In this engine a long flattened port, with large cooling surface is arranged, and the piston comes close up to the end of the cylinder. In the 250-h.p. Körting engine (Fig. 2), a projecting tube is deliberately inserted into the combustion space, and is water-cooled to increase the rate of cooling.

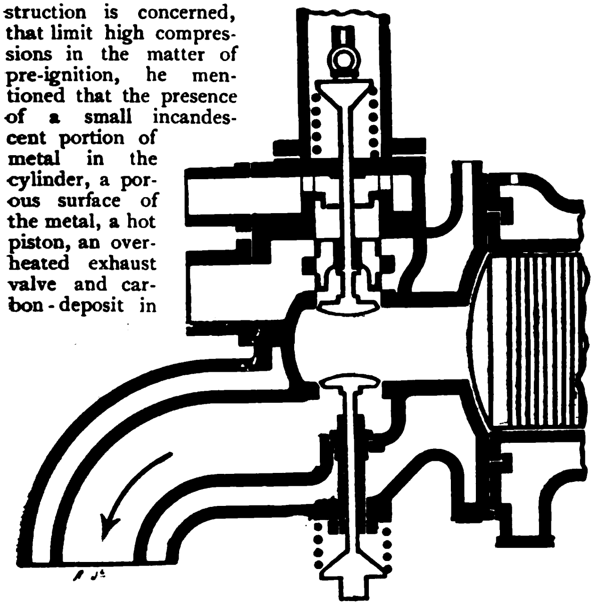


Fig. 1.—Section through combustion chamber of the "Deutz," single-acting 4-stroke gas engine.

Referring then to the tendency of recent years to increase flame temperatures within the cylinders to the highest safe economical point, he remarked that this was largely done because each maker desired to obtain the greatest power as well as the highest economy for a given price, and that it was in no way the result of ignorance or failing to realise that heat-flow increases with increase of explosion temperature. The question of high mean pressures is a most important one, and in many large gas engines it is relatively low, on the Continent about 60 lbs. per square inch, or less, though in England for medium-sized engines it is as high as 90 and 100 lbs. per square inch. He pointed out that the English engineer is by no means satisfied with the average pressure that he can safely employ in large gas engines, but that it is very desirable to reduce the heat-flow especially in them.

Mr. Dugald Clerk then gave some most interesting information concerning a means which he had devised for modifying the difficulty occasioned by these conflicting requirements, his idea being that it was possible to reduce maximum temperatures while increasing mean pressures, by increasing the charge weight per stroke given to the engine. He had experimented with two ordinary 4-stroke stationary engines, the one having a 7-in. cylinder with a 15-in. stroke, and the other a 10-in. cylinder and an 18-in. stroke, and had applied his system to them. The usual charge of gas and air is taken in during the suction stroke, and at the end of that stroke a further charge of air or inert gas is forced in, so that the pressure in the cylinder is raised to 7 or 8 lbs. per sq. in. above atmosphere before the commencement of the compression stroke. The weight of the charge in the cylinder is in this way increased by about 40 per cent., but although the degree of compression at the end of the compression stroke is materially increased, yet there is no proportional increase in the temperature of compression. Owing to the fact that only the same amount of gas is present as when using the engine in the usual way, the maximum explosion temperature is considerably reduced, because of the greater total volume of gas present; the temperature is in practice about 1,200° C. It has been found that the heat-flow was reduced to about two-thirds, and that the mean available pressure is increased about 20 per cent. Two of the indicator diagrams,

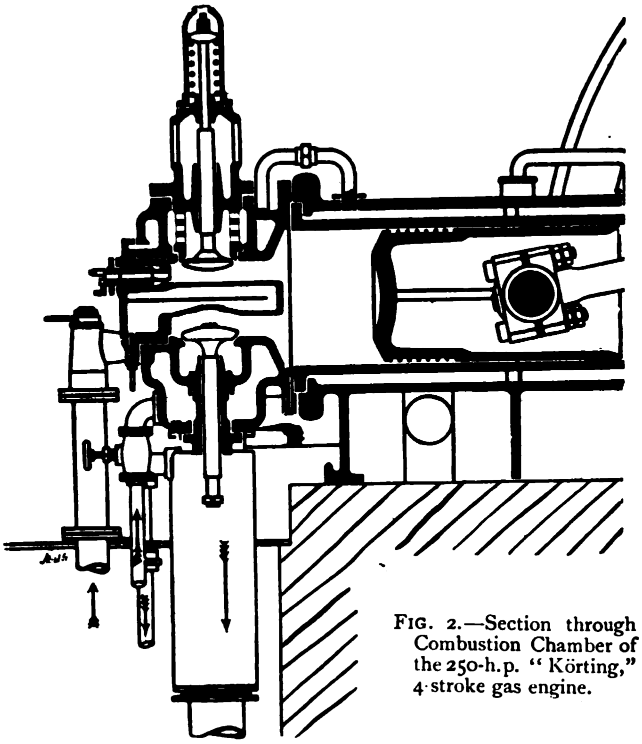


Fig. 2.—Section through Combustion Chamber of the 250-h.p. "Körting," 4-stroke gas engine.

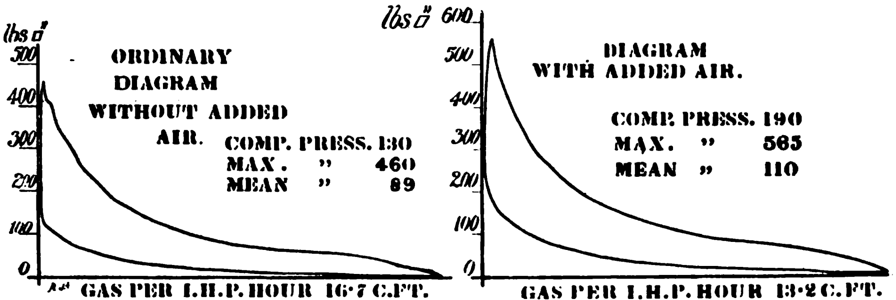


Fig. 3.—Average indicator-diagrams taken from Mr. Dugald Clerk's experimental 10-in. bore by 18-in. stroke gas engine, before and after fitting his improved system to it.

taken from the larger engines, were exhibited by the lecturer (Fig. 3), one of these being taken when running in its ordinary state and the other diagram with the additional air introduced to the charge. The chief figures obtained from the diagrams are marked on them. He pointed out that this method of increasing the practical efficiency of an engine had the merit of reducing temperatures all round, and of preventing pre-ignitions in two directions, viz., by temperature reduction and by reduced average inflammability of the charge.

The lecturer next referred to the National Gas Engine (Fig. 4), which is designed to work with high mean pressures and low flame temperatures. The front end of the cylinder is used to compress air into a space; this air is passed through ports to the charge which has been sucked in on the other side, and the charge weight is thus increased without adding additional inflammable material. When compression takes place the pressure rises to about 200 lbs. per square inch; then, on ignition, pressure is obtained equal to about 500 lbs. per square inch. This engine has been designed for mean available pressures of about 130 lbs. per square inch, and maximum flame temperatures of about 1,200°. He thought it desirable in large engines to keep cylinder dimensions as small as possible, in order to minimise expansion difficulties, and to raise the maximum working pressures to limits far above those at present used. He considered this method of reducing temperatures to be worthy of great attention.

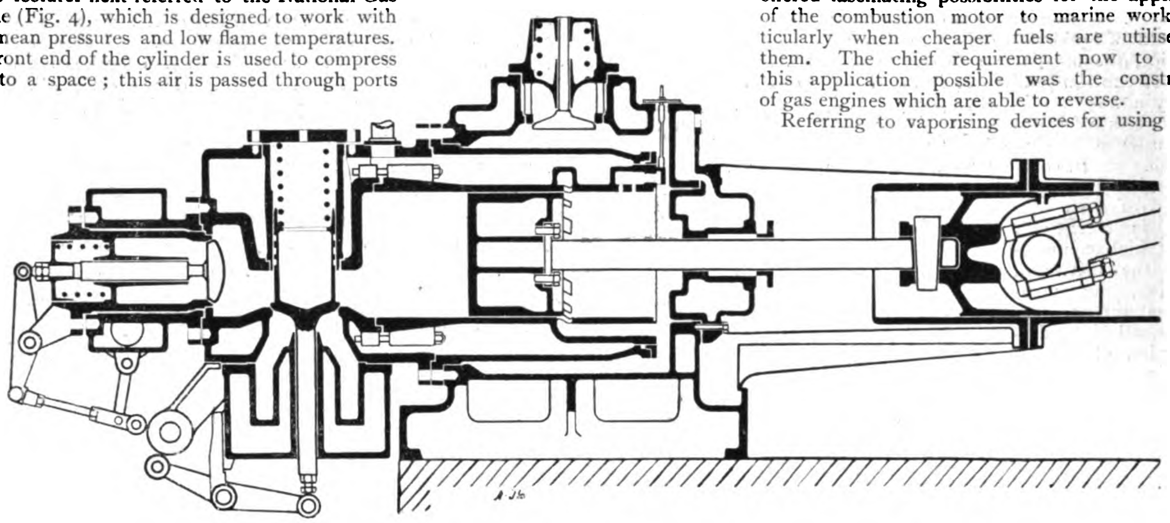


FIG. 4.—Section through Cylinder and Combustion Chamber of the 250-h.p. "National" gas engine. Bore 21 in., stroke 34 in. Fitted with Scavenger and Super-compresser.

Mr. Dugald Clerk then dealt with the question of heat losses in the exhaust, and pointed out that in large engines it is evident that heat is added during the expansion stroke at a far greater rate than is necessary to keep the line up to the adiabatic. Evidently just sufficient heat should be added to the expanding gases to keep the line up to this point, and so there are efficiency losses in these engines, the loss being greater the larger the engine. He pointed out that his experiments (as in Fig. 3) show a still further reduction of heat loss through the cylinder walls, but also a further increase in heat losses to the exhaust gases. He suggested that engineers should find some means of adding to the heat required at an early part of the expansion in order to avoid this difficulty, since greater efficiencies would at once be obtained. Concerning the suggestion that had been made for improvement in this direction by expanding to a greater volume than that of the original volume, he pointed out that although some improvement would be gained, yet the additional size and weight of the engine is essentially increased considerably also; it has in fact been found that it is more effective to diminish the compression volume.

Before leaving the question of thermo-dynamics, Mr. Clerk made the suggestion to physicists that profitable study might be devoted to the question of the laws governing the efficiency of imperfect cycles, pointing out that although a great deal of attention has been devoted to perfect cycles—such as the Carnot—yet comparatively little is given by text books to the theory of the only cycles (imperfect ones) which can possibly be carried out in practice. He referred especially to cycles of constant efficiency, mentioning the Beau de Rochas and the Joule or Brayton. More data is required concerning the laws of the cooling of gases under various pressures at high temperatures, and these are particularly required now since most of the older experiments which have been made are out of date, considering the altered composition of town gas and the extended use of other gases and liquid fuels.

Brief reference was then made to recent improvements in producers for supplying gas for internal combustion engines, and he referred especially to the suction producer which is now introduced both in this country and on the Continent. He showed Fig. 5, a section of a Dowson suction producer, and mentioned that its great advantage over the older type of producer is the absence of a steam boiler for blowing, and of a gas-holder. The air and water vapour are drawn through the incandescent fuel by the suction of the engine itself. He considered that the suction producer offered fascinating possibilities for the application of the combustion motor to marine work, particularly when cheaper fuels are utilised for them. The chief requirement now to render this application possible was the construction of gas engines which are able to reverse.

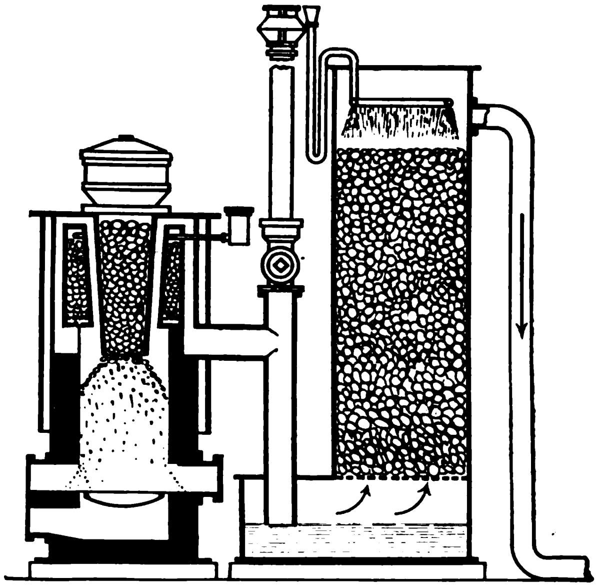


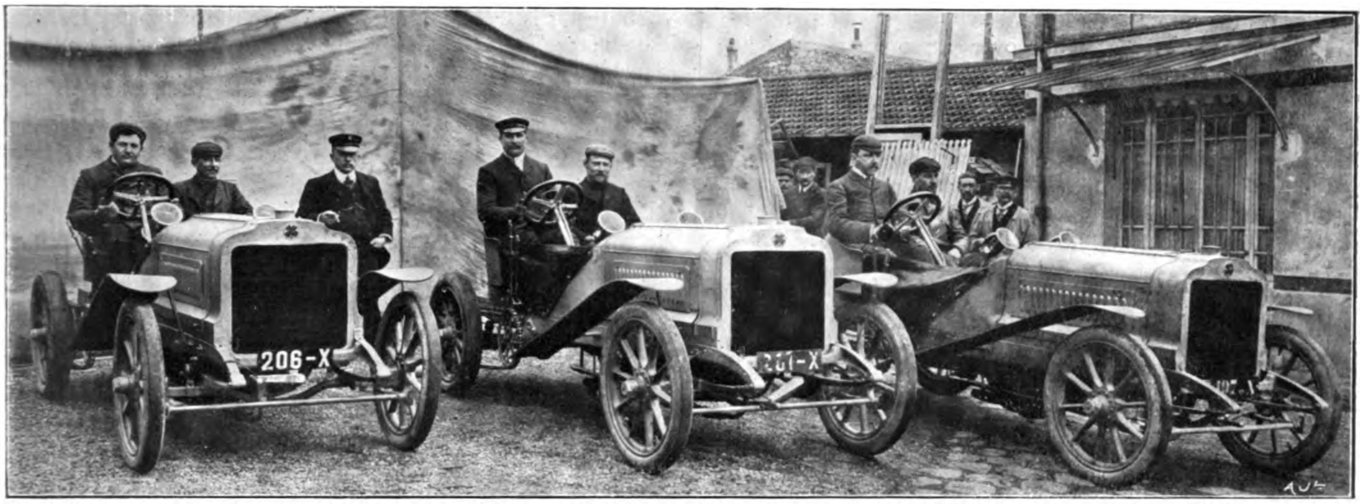
FIG. 5.—Section through a "Dowson" suction gas-producer, for feeding a 40-b.h.p. gas engine.

Referring to vaporising devices for using petrol and other liquid fuels, he considered that a very great deal of progress had been made by those responsible for the advent of the motor car, and pointed out that these engineers had been "entirely untrammelled by any considerations of precedent."

In his concluding remarks he referred to the favourable prospects of employing alcohol as a fuel for internal combustion engines.

Summing up the possibilities of the internal combustion engine, he thought that progress would be more and more rapid in the future, since the whole world is now alive to them, and an enormous amount of attention is being given to the subject in all the more civilised countries.

RACES, RECORDS, AND TRIALS.



GORDON-BENNETT FRENCH ELIMINATING TRIALS.—The Richard-Brazier team of three cars which are to be driven in the French Eliminating Trials are shown in our picture, each driver being in the car which he is handling this week on the French Circuit des Ardennes. Thery, who is in the car on the left, starts No. 5. Next is Caillois, who starts 15th, and the right-hand driver is Stead, who starts 25th. M. Brazier himself is standing by the side of Thery's car.

GORDON-BENNETT ITEMS.

The German Automobile Club announce that they have been able to arrange that the cars of all persons either taking part in or travelling to Germany to attend the Gordon-Bennett Race will be admitted over the frontier free of duty on certain conditions. The conditions are that to the car should be affixed the special Club Shield bearing the letters "G.B." As before announced, these will be supplied by the German Automobile Club to the clubs recognised by them in the various European countries. All British automobilists, therefore, whether members of the club or not, who purpose attending the event with their cars should at once put themselves into communication with the A.C.G.B.I., and obtain these shields as soon as possible. They may bear in mind that otherwise on entering Germany they will have to pay the duty, which in the case of cars touring through the country will be refunded to them on recrossing the frontier, and on the production of the official receipt for the amount. But a lot of trouble and annoyance will be saved by having these shields, as in all such cases the German Custom House authorities make no formalities, and in general if properly approached are extremely good-natured and obliging.

The German authorities have arranged that at the railway crossing which crosses the Taunus course the trains shall be stopped on either side of the gates, the passengers crossing the line and being then taken on board another train on the other side waiting ready for the purpose, thereby avoiding having to stop the racing cars continually.

In Homburg and Wiesbaden and the entire surrounding districts, by the wish of the German Emperor, a general holiday is to be observed on June 17th, the day of the race, by the Government and Municipal offices, schools, &c.

Intervals of seven minutes will, it is reported, take place between the starting of each car on its round. The announcement of the winner is to be "unofficially" notified on the evening of June 17th, but the "official" announcement will not be made until the big banquet the next day in the Homburg Kursaal.

The cost of "Westrumiting" the road between Frankfort and Homburg is to be undertaken by the Frankfort Auto Club.

Members of the German Club Racing Committee are attending the French Eliminating Trials this week with the object of applying to the race on the Taunus what they may see is good in regulating the French course.

Privately owned motor cars, after bringing their passengers to the Saalburg, will be required to then proceed to the Army manœuvring field at Oberstedten, from whence they will be called up by telephone as required by their owners.

On the 19th instant the Gordon-Bennett course is to be run over by the German Minister of the Interior, Freiherr von Hammerstein, Minister of Public Works, Herr von Budde, the Oberpresident of the Province of Hesse-Nassau, Herr von Windheim and other officials, in order that they may satisfy themselves that all the regulations and arrangements that have been agreed upon are being properly carried out.

The race meeting organised by the German Club, in conjunction with the Frankfort Auto Club, as an attraction on June 19th—two days after the great race—at Frankfort, will comprise an excellent series of events. The programme will provide for the following classes:—

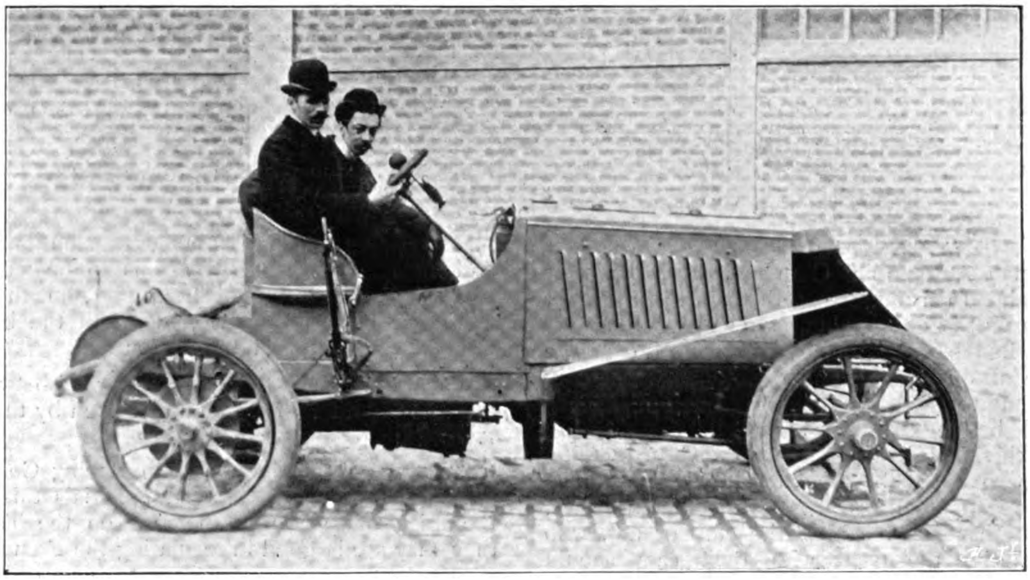
Motor Bicycles.—Distance 4·827 kiloms.; starting to be without assistance.

Light Cars up to 15-h.p. and 400 kilogs. weight, using alcohol fuel; distance 8·045 kiloms. (professionals only).

Light Cars up to 14-h.p. and 400 kilogs. weight; distance 8·045 kiloms.

Cars using alcohol fuel, up to 40-h.p. and 650 kilogs. weight; distance 16 kiloms.
Cars up to 24-h.p. and 600 kilogs. weight; distance 12·872 kiloms.
Touring Cars.—30-h.p. and over 1,000 kilogs. weight; distance 16·09 kiloms.
Touring Cars.—60-h.p. and over 600 kilogs. weight; distance 16·09 kiloms.

All the classes are open to amateurs, excepting only the alcohol light car class. Substantial prizes are offered in each class, and the last class compete for the Peters Challenge Cup, at present held by Willy Poege, of Chemnitz, besides other prizes. In all races, except motor bicycles, one passenger, besides the driver, must be carried. Entries close June 1st. Competitors must be on the register of amateurs of the Deutscher Automobil Verbaud. The racing track is a circular one, 1,609 metres (1 mile) round.



GORDON-BENNETT FRENCH ELIMINATING TRIALS.—We give above one of the Gordon-Bennett Panhard Cars, which is being driven this week by Henri Farman on the French Circuit des Ardennes, a few particulars of which appear on this page.

The ½-minute neutralised stop on the French Ardennes circuit, announced for the railway crossing at Bouvellement, has been cancelled.

The drivers for the Bayard Clement team in the French Trials have had their starting order changed. The numbers now allotted to them are as follows, instead of in the order as originally announced by the French officials:— A. Clement will start 3rd, Hanriot 13th, and Guders 23rd. The De Dietrich team also change, de Forest starting No. 1, Gabriel 11th, and Jarrott 21st.

Supplementing the brief descriptions which we have already been able to give concerning the French cars built for the Gordon-Bennett Race, we are now able to add a few further interesting particulars. The Panhard cars are fitted with engines that are said to give 100-h.p. at 800 revs. per min., and to be capable of developing about 125-h.p., and the cylinders are of steel with copper jackets. The bore of the cylinders is increased so that it is now equal to the stroke, and the stroke is the same as in last year's racing engines. High-tension-magneto-ignition has been adopted, but a battery of two cells is kept in reserve to replace the magneto itself in case of failure. The petrol tank is fixed quite at the rear of the car, is cylindrical in shape, and the feed from it to the carburettor is by pressure derived from the exhaust gases. The maker's well-known automatic carburettor is employed, and the inlet-valves—which lie opposite to the exhaust-valves—are mechanically operated.

The radiator is of a curious shape, somewhat resembling a cow-catcher, though it still forms the front of the bonnet, and is fixed above the main frame. It is built up of finned tubes, which slope down from a tank at the top, and are fixed to a curved tube of large diameter which constitutes the bottom of it. The air is drawn through the radiator by a fan formed in the flywheel. The lubricating oil-tank is of large size, and lies against the front of the dash beneath the bonnet.

The main clutch is very compact, and is, in a modified form, of the "Weston" pattern, in which alternate, thin, flat discs engage with a driving drum and the intermediate ones with the driven shaft; the spring forces all the discs against one another in the well-known way. The gear-box is made of a single casting with detachable ends forming the bearings for the shafts. A direct-through drive is obtained on the top speed, and the lay-shaft, which does not revolve when that speed is in use, lies immediately beneath the through-shaft. A separate hand-lever is fitted for introducing the "reverse." The propeller shaft has universal joints at both ends, and there is a central, forked radius-rod between the back axle and the frame. This rod is fixed, both above and below, to the casing surrounding the differential gear, and is hinged at its front end. The differential itself is of quite a new form of construction. The side brakes are of the internal type, and the brake-drum, upon which the foot-brake acts, is placed immediately behind the gear-box.

No less than nine Clement-Bayard cars, in all, have been built with a view to taking part in the race, these vehicles being of three distinct types. The two smaller models have live-rear-axles, and the largest set of three racers have side-chains. The smallest cars are similar to those that took part in the Gaillon hill-climbing event, and are practically reinforced light cars. The intermediate type are of even stronger construction than these, and their engines are capable of developing about 90-h.p.; they are said to be capable of travelling at a speed of about 80 miles per hour.

The large chain-driven racers have engines of 120-h.p. or upwards, but it appears to be doubtful whether they will be ready in time to take part in the race. The engines have their inlet-valves on the left, their exhaust-valves on the right, and the igniters placed centrally above the cylinders. A variable lift is provided for the inlet-valves, and a low-tension system of magneto ignition is employed. The main-frames are of pressed steel, and the wheel base on these cars is about 9 ft. 10 in. They have metal-to-metal friction clutches, and a pressure-feed is adopted for the petrol.

The special feature of novelty in the Mors racers has already been mentioned, the cylinders being placed out of line with the crank-shaft so that their axes are tangential to it. Each cylinder, together with its valve chamber, is made from a solid block of steel, and there is no joint of any kind. These cars have nickel steel main frames and axles, and their change-speed-gears are provided with ball-bearings. Their external appearance is somewhat similar to that of the Paris-Madrid model of last year.

MOTOR UNION OF IRELAND RACE MEETING on Portmarnock Beach, on Saturday, May 14th. A pair of motor bicyclists getting well away in their heat.

The three Fiat cars, which have been built to represent Italy in the great race, have recently undergone their preliminary trials on the road, and a speed of 80 miles per hour is said to have been attained. No change has been made in the drivers, who will be MM. Storero Laucia and Cayno, the latter being chaffeur to Queen Marguerite of Italy. The engines are capable of developing over 60-h.p., and there are four forward speeds available in the gear-box. The chassis are constructed with pressed steel frames, radiators of the honeycomb type are fitted, and the chief dimensions of the cars are:—wheel base, 9 ft. 2 ins.; track, 4 ft. 5 ins., and tyres 910 mm. diameter.

Apparently in very desperation, the A.C. of America have determined to have further trials for the entered cars to represent America in the race. But we fancy the result will be all the same. These trials were down for Thursday, this week, and were to be held on the Empire track, over a distance of 200 miles, with "controls" every 30 miles. In these, probably, Oldfield in the Winton Bullet II, Mooers on a Peerless, and Christie on his "Christie" car will participate. Hewitt has finally withdrawn from the contest.

THE scheme for the trials of small cars for 1904 is now being prepared by the Technical Committee of the A.C.G.B.I.

THE date of the Commercial Van Trials, organised by the A.C.G.B.I., has, it is announced, again been altered—from February 1st to March 1st, 1905.

WE recorded an unsuccessful attempt recently of Baron de Caters on a 90-h.p. Mercedes car to lower Rigolly's world record for the kilometre. Last Sunday the Baron made a second attempt on the Nieuport-Ostend road, in which he successfully reduced Rigolly's time of $23\frac{3}{5}$ secs. by $\frac{3}{5}$-secs. for the flying kilometre. This gives a speed of 156·521 kiloms. (97·2 miles) per hour. The times were officially taken. Upon hearing of the Baron's success, Rigolly intimated his desire immediately to challenge with his Gobron-Brillie racer not only the Baron, but Jenatzy, Werner, Braun, and W. K. Vanderbilt, Jun., to run their Mercedes cars against his Gobron-Brillie under identical racing conditions. But, says the Baron, writing to *Le Vélo*, "*a lui non pas la parole, mais les actes maintenant.*"

As a preliminary test for the International Hill Climb up Mount Cenis which is organised annually by the Swiss Automobile Club, a hill trial was carried through last week by the Club at Port-Noir-Cologny, when in the car class a 5-h.p De Dion was first in 6 mins. $47\frac{3}{5}$ secs., a 6-h.p. G. Richard in 5 mins. $9\frac{4}{5}$ secs., and an 18-h.p. Mors in 3 mins. $43\frac{4}{5}$ secs. in categories A, B, and D, respectively.

UNDER the auspices of the A.C., Bordelais, an automobile week has just been concluded. The programme commenced on May 8th, with an event for motor boats at Bordeaux. The next day a trial for tourist cars took place, bringing together 22 competitors. Speed tests, on the flat and on hills, and other tests were made and taken into account in making the awards. The tourist trial was continued and concluded on May 10th. Two days were then devoted to aeronautical contests, followed, on May 13th and 14th, with a trial for motor omnibuses, delivery vans and passenger cars, &c.

A TWO days' tourist car trial, organised by the A.C. of Touraine, was run off on the 13th and 14th inst. The first day's run, in which 24 cars and 8 motor cycles took part, was over 253 kiloms., including a hill-climb at Beugny, over 200 metres. On the second day 251 kiloms. had to be covered. Besides the regularity of running, other points were taken into account for awards, including consumption, ease of starting, &c. The principal awards were as follows:—

CLASS 1.—Cars costing under 6,000 francs:—1. De Dion, 1,501 points; 2. Delahaye, 1367; 3. De Dion, 1,367.

CLASS 2.—Cars 6 to 12,000 francs:—1. Brouhot I. and II., 1,430 and 1,421; 2. De Dion, 1,351; 3. Vivinus, 1,329.

CLASS 3.—Cars over 12,000 francs:—1. Delangère, 1,609; 2. Peugeot, 1,436; 3. Herald, 1,410.

MOTOR BICYCLES:—1. Bruneau, 1,081; 2. Lamaudiere, 835; 3. Lamaudiere, 669.

Special prizes for cars:—*Fuel Consumption*:—De Dion. *Regularity*:—Ties: Delangère, Brouhot, Peugeot and Boyer. *Hill Control*:—1, Herald; 2, Herald. *Starting*:—Peugeot. *Appearance*:—1, Herald; 2, Delangère.

The bicycles were timed over 300 metres (standing start and standing stop) as follows:—1, Bruneau, 40 secs.; 2, Lamaudiere, 42 secs.

Touzelet was awarded a diploma of honour for his tyre-inflating pump, which only took one minute to fully pump up tyres of 120 mm.

The would-be competitors at the foot of the hill awaiting the decision of the judges.

Mr. A. W. Marriott ascending the hill on his Griffon, just before his accident.

Last week a hill climb had been arranged by the Hertfordshire Automobile Club, at Dunmore Hill. Owing to the fearful state of the roads it had to be postponed (until June 21st). The competitors, however, were at the venue, as shown in our photographs, which are from negatives by Mr. Quintin Miller.

THE rules have now been published for the competition of pneumatic tyres, which is to take place on May 27th, on the right bank of the Seine, near the Neuilly Bridge. The object of these tests is to ascertain the difference in resistance to traction offered by the various types of tyre. They will be applied successively to the wheels of an electric automobile, the rear wheels of which measure 1,020 mm. by 120 mm. The vehicle chosen for the purpose is not to have any body, and only to be provided with a seat for the driver, the total weight being 1,800 kilogs., the weight on the rear wheels corresponding to that which it would be in the case of an ordinary automobile with four passengers and luggage, that is to say, 1,000 kilogs. The tests will be comprised in two categories—for ordinary pneumatics and anti-skidding pneumatics. Each competitor is limited to two tyres of the same type, and the tyres must be sent in at eight o'clock in the morning to the rendezvous at the Neuilly Bridge. The tyres must be adapted for fitting on to wheels of which the dimensions are given, and will be pumped up to 4, 5, and 6 atmospheres for the different tests. The experiments will be made by taking the electric current consumption of the vehicle with the different tyres at speeds of 16, 18, and 30 kiloms. per hour. The amount of slipping, which is an important element in the relative excellences of tyres, will be estimated by counting the revolutions of the wheels by means of a speed counter, while a cinematograph is also to be employed both for this purpose and determining the rate of acceleration. To facilitate the determination of the cinematograph one of the spokes of one of the wheels is to be painted red.

IT has been decided by the Federation of American Motor Cyclists that from January 1st, 1905, motor bicycle records will not be recognised for machines with engines weighing over 50 kilogs. This appears to be a very wise decision, and is aimed at the elimination of the absurd monstrosities and freaks which have been seen on racing tracks of late. The Federation are organising an Endurance Contest to take place from July 2 to 9 next.

Auto Cycle Hill-climb.—The hill-climbing competition for standard touring motor bicycles, announced to be held by this club last Saturday, took place in delightful weather, on one of the side roads off the Great North Road beyond Northaw, in Herts. The length of the stretch is over 700 yards, with gradients ranging up to about 1 in 8. No pedalling was allowed. A little over 30 competitors met, as previously arranged, at the Old Salisbury Arms, Barnet, where the formalities of weighing were gone through. Of the starters three machines failed to get to the top of the hill. The judges were Professors Vernon Boys and Callendar and Mr. Claude

Johnson. Subsequent examination of the machines took place at the Old Salisbury Arms, and not until several points have been fully considered will the awards and times be announced officially.

Motor Cycle Union of Ireland.—Under the auspices of this body a novel meeting for Great Britain was held last Saturday. Races for motor cyclists were arranged to take place on the hard silver strand of beach between Portmarnock and Malahide, within easy distance of Dublin. Glorious weather brought together a big crowd to witness the races, which were successfully carried through without a hitch, although many of the heats were rendered terribly tame owing to the absence of some of the competitors, necessitating several "walk overs." The course was a dead straight mile, and the classification was by weight. The results were as follows:—

CLASS A. (under 120 lbs.).—1. W. B. Martin (F.N.), 1 min. 53 secs.; 2. E. G. Drury (Triumph).

CLASS B. (under 150 lbs.).—1. C. B. Franklin (F.N.), 1 min. 42 secs.; 2. R. W. Stevens (Phœnix).

CLASS C. (unlimited as to weight).—1. C. B. Franklin (F.N.), 1 min. 45 secs.; 2. R. W. Reton (Riley).

Southern Motor Club.—A permit has been granted to this club by the Auto-Cycle Club for a 100 Miles Reliability Trial for motor cycles for amateurs.

Paris-Bordeaux-Paris Motor Bicycle Reliability Trial.—The awards have now been issued by the Auto Cycle Club of France in this long-distance test, held recently, and of which we gave a report at the time. Nineteen gold medal diplomas, one silver medal diploma, and five honourable mentions are given as follows, the numbers being the official starting numbers:—

GOLD MEDAL DIPLOMAS.—3. J. Bruneau, Foulon; 5. Lurquin-Coudert, Denis; 8. Werner, Bonnart; 10. Minerva, Kuhling; 11. Lamaudiere-Mauger, Baron; 14. Lurquin-Coudert, Coudert; 15. Bonnet et Jumel, Taron; 16. Georgia Knap, Castagni; 17. Minerva, Olieslagers; 19. Werner, Demy; 20. Lamaudiere, Canesse; 28. Georgia Knap, Chauffour; 30. Cavelier, René; 31. Bruneau, Barré; 35. Stimula, Lepetit; 40. J. Carreau, Carreau fils; 57. F. N., Mauxion; 50. Alcyon, Canale; 64. Clement, Dacier.

SILVER MEDAL.—50. G. Doué, G. Doué.

HONOURABLE MENTION.—39. Van Altema, Van Altema; 49. La Foudre, Galliot; 59. Alcyon, Jamin; 63. Gladiator, Oster.

THE QUARTERLY 100 MILES TRIALS.

THE quarterly 100 miles non-stop trial of the A.C.G.B.I. was held on May 13th. The route was the usual one towards Oxford and back. The road was good, no dust. The weather was fine; the wind on the outward very little, on the return journey fairly strong against.

THE HILLS on which hill-climbing trials took place were:—

(*a*) THE STEEP PORTION OF DASHWOOD HILL, commencing at 33rd milestone, and ending at danger-board at the top, 1,180 yards, having an average ascent of 1 in 16, and including 352 yards of 1 in 10·9.

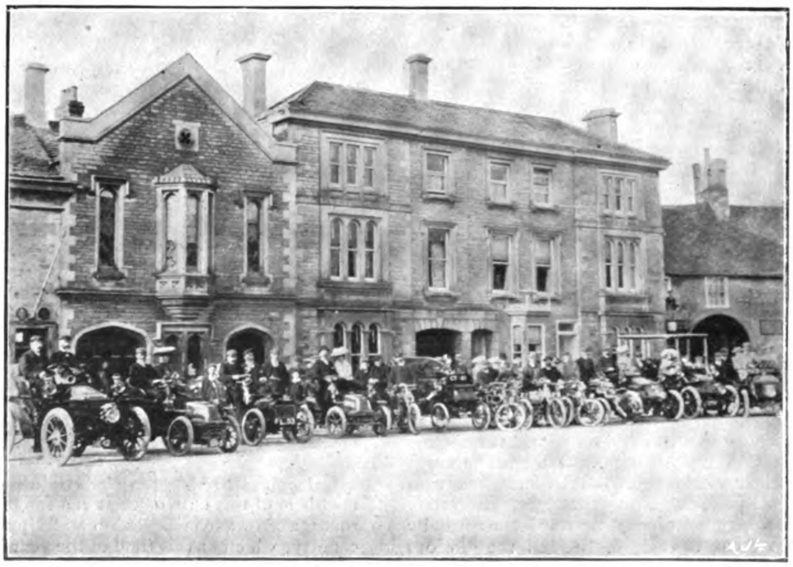
(*b*) ONE MILE, INCLUDING DASHWOOD HILL, commencing at 33rd milestone, and terminating at 34th milestone, having a total rise of 241 ft. in 1 mile, including 275 yards of a gradient of 1 in 21·7 and 600 yards of a gradient of 1 in 11.

(*c*) ASTON HILL on the return journey. Distance 1 mile 1,100 yards, having a total rise of 300 ft., and including 1,910 yards of a gradient of 1 in 21.

The only car entered was the four-seated 4-cylinder 18-h.p. Siddeley car fitted with high-tension electric ignition, cooling by radiator and fan. Weight, without passengers, 19 cwt. 1 qr., with four passengers, 24 cwt. 2 qrs. 13 lbs. Fuel used, 4 gals. 3 qts. 1 pt. 10 oz. Water, 1 gal. 12 ozs. Average cost of fuel per mile at 1*s*. 3*d*. per gallon, ·74*d*. Speed, outward journey up to legal limit; return journey, 18·07 m.p.h. Hill-climbing speeds, with four passengers, up (*a*) 2 mins. 35 secs. = 15·57 m.p.h; (*b*) 3 mins. 20 secs. = 18 m.p.h.; (*c*) 5 mins. 7 secs. = 19·06 m.p.h. The car ran most regularly throughout, and climbed the hills in fine style.

CLUB DOINGS.

South Lincolnshire Motor Club.—An extremely pleasant and enjoyable meet in connection with this newly-formed club was held at Market Deeping on Saturday afternoon, May 14th, upon the invitation of Mr. and Mrs. G. Linnell, of Fron Hall. Deeping is on the edge of the Fens, and motorists who journeyed thither had no serious hills to negotiate, the country for miles round being absolutely flat. The weather was bright and fine, albeit there was a strong wind, which at times blew the dust in blinding clouds. This was the only discomfiting condition. Close upon twenty cars and cycles assembled at the rendezvous, and among them were:—Dr. Miller (the club captain) and Mrs. Miller (Wrangle) on a 4½-h.p. De Dion; Mr. F. Richardson, of Sibsey (the club's hon. secretary), with Mr. Herringshaw (Boston), on a 10-h.p. Wolseley; the Rev. F. and Mrs. Taylor (Boston), on a 4½-h.p. Benz; Dr. Benson, J.P. (Market Deeping), on a 6½-h.p. Humberette; Capt. and Mrs. Strangeways (Deeping St. James), on a 3-h.p. Enfield Quad; the Rev. S. W. Skene (Deeping St. James), on a 2½-h.p. Vinco-Minerva cycle; Dr. and Mrs. Husband (Crowland), on an 8-h.p. Wolseley; Mr. T. R. Mawby (Spalding Marsh), on a 3-h.p. Rex cycle; Mr. and Mrs. T. W. Mays (Bourne), on a 6½-h.p. Humberette; Dr. Stiles (Spalding), on a motor cycle; Dr. Stanton (Market Deeping), on a motor cycle; Mr. H. W. White (Spalding), on a 3-h.p. Centaur; Mr. A. Green (Spalding), on a 5-h.p. Baby Peugeot; and Mr. J. H. Carter (Market Deeping), on a motor cycle. The host and hostess spared no pains to make the visit as enjoyable as possible. The guests spent some time in the picturesque gardens, and here a photograph was taken of the ladies who accompanied the cars. In addition to the motorists, Mr. and



Meet of the South Lincolnshire Motor Club, on May 4th, at Fron Hall, Market Deeping, the residence of Mr. and Mrs. G. Linnell.

Mrs. Linnell entertained many of their personal friends, and tea was served to between 40 and 50 guests in one of the upper rooms of the Town Hall, which adjoins Mr. Linnell's residence. It may be mentioned that Mrs. Linnell is, at present, the only lady member of the club, and she takes an especial interest in the pastime, having travelled several thousand miles with her husband in their beautifully appointed 10-h.p. Wolseley, which was also on "parade." After tea the cars were drawn up in line in front of Fron Hall, and a photograph was taken of the party just before they returned home. By 6 o'clock most of the cars had left for their various destinations.

SOUTH LINCOLNSHIRE MOTOR CLUB.—Group of Lady Motorists who were present at the Meet of the Club at Market Deeping, last Saturday. The photograph was taken in the gardens of Fron Hall.

Derby Automobile Club.—A well-organised contest in the form of a hill-climbing trial took place last Saturday under the auspices of this Club. The point selected was Hazlewood Hill, near Duffield, where the road rises about 300 feet in a little under a mile, the gradient gradually increasing as the summit is reached, rising to about 1 in 7 towards the end. The formalities of weighing for handicap purposes were gone through in the Hazlewood Station Yard, and the first vehicle, Dr. Wilson's, was dispatched up the hill at 3 p.m. Mr. Leach, the Hon. Treasurer, made an admirable starter at the foot of the hill, whilst the timing at the top was in the hands of the Hon. Secretary, Mr. C. J. Allin. Amongst the cars taking part were those of Mr. M. J. Astle, 12-h.p. De Dion, who, following his last year's success, again made the fastest run up; Mr. G. F. Reading, with a 10-h.p. Wolseley car with a heavy body, coming within 16 secs. of him. The next best speeds were attained by Dr. Hunt, Mr. Guest and Mr. Leach, and amongst the others who took part were Messrs. C. J. Bamford (Clement), Pounds (Benz), Sale (Wolseley), Mell (Chenard-Walcker), Ford (M.M.C.), Ford (Talbot), Dr. Arundel (Argyll), Dr. Donald (De Dion), &c. Three medals were offered by the club, viz., one for the quickest ascent irrespective of horse-power, one for cars handicapped according to cylinder capacity and weight, and one for cyclists under the same conditions. The winner of the handicap medal will be announced when the whole of the results have been worked out. The splendid weather brought together a considerable number of spectators who stationed themselves at various points of vantage on the hill, and entered thoroughly into the competitive spirit of the meeting. The cars had finished their trials at 4 o'clock, after which the visitors dispersed to enjoy themselves in the beautiful rural surroundings, many from previous experience having provided themselves with the wherewithal for enjoyable picnics. The general departure took place subsequently, the majority wending their way homeward by circuitous routes to enable them to enjoy to the full the glorious evening's run.

Berkshire Automobile Club.—Field-Marshal Earl Roberts, V.C., who resides at Ascot, has consented to become honorary president of this club. The remaining fixtures for the ensuing season arranged are as follows:—June 8th, at Ockwell's Manor, Maidenhead, by invitation of Mr. E. A. Barry; June 25th, at Beenham Grange, Beenham, by invitation of the hon. sec., Lt.-Col. W. Waring; July 13th, at Holme Park, Sonning, Reading, by invitation of Capt. E. F. Rhodes; July 30th, at St. Ann's Hill, Chertsey, by invitation of Mr. Jas. F. Ocks; September 14th, at Inglewood House, Hungerford, by invitation of Mr. H. J. Walmesley.

East Surrey Automobile Club.—We are notified that Mr. C. Guy, of 16, West Street, Reigate, after very careful investigation, has been appointed official repairer to this club, and should prove of considerable assistance not only to the members of the East Surrey Club, but also to automobilists generally using that district, as he is stated to have had very considerable experience and is thoroughly competent to undertake all repairs. He is also open to teach driving either to members or their servants, and can store cars when under repair, besides stocking a considerable selection of parts.

Hertfordshire Automobile Club.—Arrangements had been made for May 10th by the executive of this club to hold a hill-climbing contest for motor cycles on Denmore Hill. Owing, however, to the bad condition of the roads, following the heavy rain which had been experienced, when the members on their cars and the competitors on their cycles arrived at the foot of the hill it was found, as had been surmised, that it was a practical impossibility to carry out the contest, and it was determined that the event should be postponed until June 21st. In spite of the bad state of the surface, however, eight motor bicyclists determined to unofficially attempt the climb. Several accidents were, consequently, narrowly escaped, and some near shaves were experienced. Mr. A. W. Marriott was less fortunate, and, failing to save himself from a bad spill off his Griffon cycle as he was rounding the curve near the top, he came in luckily for nothing worse than a few severe bruises.

The club fixtures for June 4th, July 2nd, August 6th, and September 3rd are notified as being cancelled, and the club have arranged to visit Sufton Court on July 12th, where they will be entertained by their President, Mr. J. T. Hereford.

DERBY AUTOMOBILE CLUB.—Hazelwood Hill Climb. A 10-h.p. Wolseley passing a Benz Car at the summit of the hill. Timekeeper's car, Mr. C. J. Allin (Hon. Sec.), is to left with the flag.

Leicestershire Automobile Club.—Oakham was visited by the members of this club as their run for last Saturday afternoon. The route taken was via Billesdon and Uppingham, a glorious stretch of country, which at this time of the year looks its best. Fifteen cars and two motor bicycles participated in the outing, and nearly 40 members and their friends were hospitably provided for at the Crown Hotel, Mr. King, in the absence of the President, Mr. G. E. Mawbey, presiding. Instead of the members returning direct to their destinations, an invitation to call upon Colonel Powell, of Melton Mowbray, was taken advantage of on the return journey, when the interest of the visitors was keen in hearing a vivid description of the Motor Eliminating Trials, from which Colonel Powell had just returned, in the Isle of Man. Later, at Systen, a second call was made upon Mr. Harding, and Leicester was subsequently reached a little before 10, everybody being delighted with their day's experience. Amongst those who took part in the run were the Hon. Charles Douglas, Messrs. T. C. King, Orson Wright, J. F. Johnson, E. S. Harding, Victor Oliver, Earp, R. E. Parker, F. O. Robinson, Barron, Dr. McAllister-Hewlings, J. McAlpin, Perkins, Gilbert, H. V. Oliver, Whitby, E. H. Herbert, Clerk, Thomas, Binns, S. Langmore, Thompson, Harris, Gerard, L. Pierpoint, Haynes, and A. McAlpin (hon. secretary). In addition, the outing was graced by the presence of a number of the wives and lady friends of the members.

Lincolnshire Automobile Club.—The members of this club had another very successful meet on Thursday afternoon when the Red Lion Hotel, Boston, was the rendezvous. The club has been singularly fortunate this year, so far as the weather is concerned, for every run up to the present has been favoured with pleasant sunshine and excellent roads. In all thirteen cars put in an appearance at headquarters, and amongst them were Mr. C. W. Pennell (Lincoln), who came on a 12-h.p. Richardson; Mr. H. S. White (Lincoln), on a similar car; Mr. C. Nelson (Lincoln), on a De Dion; Capt. Gleed, J.P. (Donington), on a Baby Peugeot; Mr. W. A. Tomlinson (Sleaford), on a Bardon; Mr. G. Godson (Asgarby), on a Daimler; Rev. R. H. Simpson (East Keal); Rev. M. Wilkins (Croft); Mr. Leslie Pogson (Sleaford), on a motor cycle; Dr. White (Swineshead), on a motor cycle; Dr. Benson (Market Deeping), on a new 6½-h.p. Humber; Mr. J. H. Carter (Market Deeping), on a motor cycle: Mr. F. Richardson (Sibsey), on a Wolseley; Dr. Crompton (Benington), on a Baby Peugeot; Dr. Miller (Wrangle), on a Baby; Dr. Reckett, Mr. C. Holland, and some of the other Boston members were also present. Several of the motorists brought their wives and friends, and between 40 and 50 were present at the tea.

The deputation, consisting of Dr. Cragg (hon. sec.), Mr. C. W. Pennell, and Mr. George Godson—who were appointed by the County Club to meet the delegates of the South Lincolnshire Motor Club, Mr. F. Richardson (hon. sec.), Dr. Crompton, and Dr. Miller, to discuss a proposal to amalgamate the two organisations—discussed the idea at some length, but the new club was not favourable to the movement, and nothing came of the suggestion. It was, however, unanimously resolved that the committees of the two clubs should meet, as occasion arose, to discuss matters of common interest.

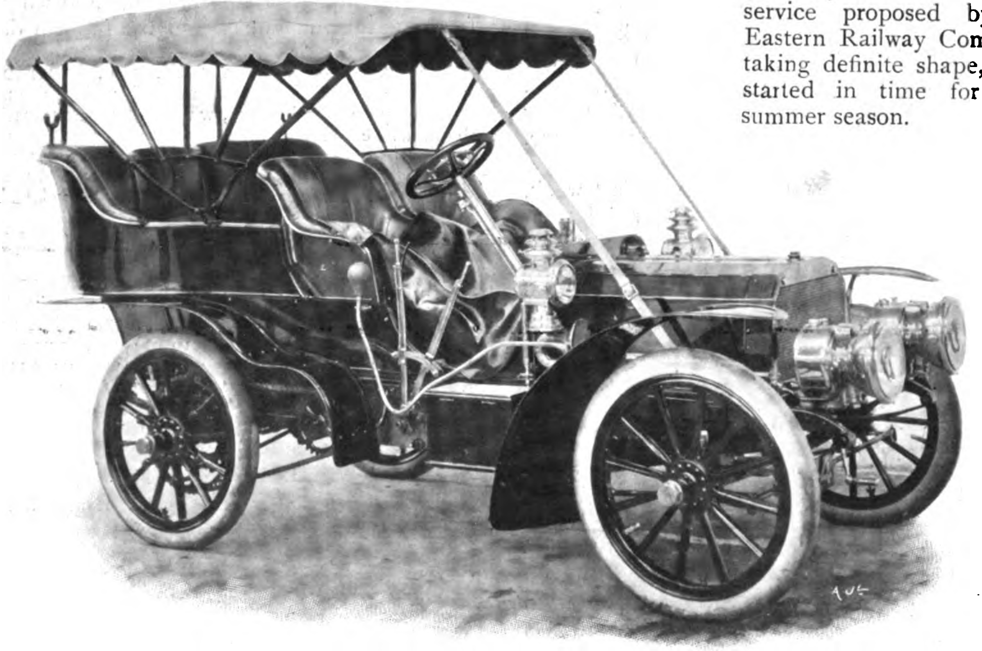
Manchester Automobile Club.—Twenty-two cars, bringing members and friends, took part in last Saturday's club run to Old Moreton Hall, which is situated at the extreme corner of Cheshire, off the highway between Congleton and the Potteries, its exact position being indicated by the conspicuous landmark of the Mow Cop. The Manor House is one of the most perfect specimens of a half-timbered structure, and is one of the most beautiful examples in the country both of the Tudor and Jacobean periods. Its projecting upper storeys and quaint windows, its gabled roof and ivy-clad chimneys, and its walls chequered in black and white, form a striking picture from the highway. As a charming subject for amateur photographers it is irresistible, and the number of views taken upon this occasion must have been very great, including a general assemblage of the cars arranged in a semi-circle by the side of the hall.

Poole Motor and Cycle Club.—Recently the name of this club has been altered to the title at the head of this paragraph, and the wisdom of this proceeding was shown at the first run of their season, held about a week ago, when no less than forty members and their friends participated in the opening ride to Bere Regis. The President, Councillor Charles Carter, dispensed hospitality at the Royal Oak Hotel, and he subsequently drew attention to the programme for the season, which included a picnic at Badbury Rings next month, a visit to the Vice-President at Studland in July, and runs to Chewton Glen, and Creech Grange, where the members would be entertained by the Committee and officers of the club.

OFFICIAL tables of lighting-up times have been issued to the Metropolitan Police, so that automobilists should now be specially cautious to have their lights going in good time.

To enable the Surveyor for the West Riding District to keep a more constant and efficient control over the roads and bridges of the district, the county authorities propose acquiring a motor car at a cost of £1,000.

THE scheme for connecting up Lowestoft and Southwold by means of a motor car service proposed by the Great Eastern Railway Company, is now taking definite shape, and will be started in time for the present summer season.



The lines upon which the carriage portion of the 1904 models of the Brooke Car are being built show a very vast improvement upon some of the earlier types. In our photograph is shown one of the latest 15–20-h.p. cars of that make which has just been delivered to Mr. C. J. Morgan, who after sampling two previous Brooke cars has just added the above vehicle to his stud.

AMONGST the forty entries already received for, the Paris-Trouville Motor Boat Race taking place in August next, No. 12 was given under the mysterious letter of "X." This is now amplified by the publication of Lord Howard de Walden's name with an English racing boat.

ON the occasion of the British International Cup for motor boats taking place at the end of July, the Royal Victoria Yacht Club have intimated their desire to assist in every possible way. For the Eliminating Race for British representatives, the same specification for the course, it has been decided, will apply as to the actual race itself.

COUNT RÉCOPÉ has been settling final details in connection with the Calais-Dover motor boat event. Up to August 6 (Saturday), the competing boats will be able to take trial runs on the sea in the neighbourhood. On the 7th they must take part in the Exhibition which will be held at the port. They will, on the Monday, parade in line before the Casino, and be all started simultaneously punctually at 10 a.m. The French Chamber of Commerce are prepared to supply pilots to any boats requiring them, at a minimum cost of 25 francs per pilot, and a special steamer conveying members of the A.C. of France and others will accompany the boats across the Channel.

COMPLAINT cannot be made against our Royal Family for not patronising home industries. Following the splendid example of the King and the Prince of Wales, His Royal Highness the Duke of Connaught has selected for his use a 30-h.p. 6-cylinder Napier car. For his son, Prince Arthur of Connaught, His Royal Highness has chosen a Gladiator.

OUR readers will remember the impression made at the Portsmouth Manœuvres, which were attended by His Majesty the King some little time back, by the Maxim gun which Capt. Scott mounted on an automobile. This equipment displayed great capabilities, and it is interesting to learn that the Motor Volunteer Corps are now to be furnished with a similar contrivance.

IN answer to Mr. Toulmin in Parliament last week, Mr. Long gave his assurance that the precise regulations in regard to heavy motor vehicles would be issued as speedily as possible. We, last week, gave the text of the recommendations, which no doubt will receive due respect, of the Departmental Committee appointed to inquire into this very important subject.

THE use of Sirdar rubber tyres appears to be spreading very rapidly, especially in connection with public service and the heavier class of traffic. The Great Western Railway are now running about fifteen sets, the Eastbourne Corporation six, the North-Eastern Railway six, and they are now being fitted in increasing numbers by Dürkopps, Milnes-Daimler, &c. The cost of maintenance in most of these cases has been found to work out at 1½*d* per mile, which, taking into consideration the heavy character of the vehicles employed, shows a valuable advance in tyres of elastic material.

IT is to be hoped that automobilists travelling to Eastbourne will be especially careful in no way to exceed a reasonable speed within the town limits. A very strong feeling in favour of automobilists exists in the district, but a few feel that certain speed limits should be applied for on certain roads in the town. The more reasonable section of the Watch Committee have, however, got the application postponed until the effect has been ascertained of the notice-boards, which are being erected, requesting motorists to drive slowly. This is undoubtedly a very reasonable proceeding, and one which should be duly respected by the whole body of automobilists.

THE Russian Automobile Club, it is reported, have officially notified the Belgian A.C. that they will not renew their affiliation agreement.

WHEN the St. Louis Exposition opened on April 30th, with the exception of two exhibits, the hall allotted for automobile exhibits was a howling wilderness. The only cars to time and properly in place were four White Steam touring cars and six Grout cars.

LAST Saturday night, the Nice Automobile Garage in the Boulevard Gambetta was totally destroyed by fire, about 40 motor cars and large stores of petrol and tyres being completely destroyed. Fortunately, the fire was localised by prompt measures.

AT last the final judgment has been reached in America in the case of Mr. Fair, the American millionaire, who was killed some time ago in a motor accident in France. The New York Supreme Court has held that Mr. Fair died subsequent to his wife, consequently the bulk of his estate goes to *his* relatives.

AS a counter move to the exploiters of the Selden patent claims, the American agents of Panhard and Levassor are reported to have started a crusade in the United States in connection with a patent No. 493,082, of March 7th, 1893, which they hold, providing for "a new and improved road wagon," and which they claim many of the gasoline cars of the present day infringe.

MESSRS. H. H. P. DEASY AND CO., LIMITED, who have for some time occupied offices at 217, Piccadilly, are now removing to 10, Brompton Road, S.W., where all communications should for the future be addressed.

BANKRUPTCY COURT.

Velox Motor Company, Limited (in Liquidation).—Under the winding-up order made against this company last November, Mr. H. Brougham (Official Receiver and Liquidator) has now issued his report to the creditors and shareholders. The statement of affairs shows liabilities £4,035, against assets £755, with a total deficiency of £21,474 to the contributories. The Official Receiver reports that the company was promoted by the New Amalgamated Tyre Company, Limited, in October, 1802, with a capital of £50,000 divided into 200,000 shares of 5*s*. each, to enter into and carry into effect an agreement with the promoting company, and to manufacture, sell, and deal generally in motors. Under the articles of association the minimum subscription upon which the directors might proceed to allotment was fixed at ten shares, whilst the directors had power to pay a commission of 80 per cent. on the nominal value of the shares to any person in consideration of his subscribing, or agreeing to subscribe, for any shares of the company, or procuring or agreeing to procure subscriptions for any shares thereof. The purchase price under the agreement was £4,400, and was satisfied by the payment of £400 cash and £4,000 in shares. In all 72,875 shares were issued, and the company commenced business in February, 1903. The working capital was about £3,000, and two directors advanced £515 to the company, secured by debentures covering the company's property to the extent of £1,500. On October 5, 1903, a receiver was appointed on behalf of the debenture-holders, and he carried on the business for the purpose of completing orders in hand. The failure of the company was ascribed to lack of working capital.

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GORDON-BENNETT FRENCH ELIMINATING TRIALS.—Thery finishing at Mazagran—the driver who did best in the Ardennes Trials last Friday when he drove a Richard-Brazier car, and by his regular travelling, although on a comparatively speaking low-powered racer, was well ahead of all the other competitors for representing France in the great race on June 17th in the Taunus.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
May 28 ...	Auto Cycle Club Combined Run to Yarmouth.
May 28 ...	Nottinghamshire Club Hill Climb.
June 11 ...	Automobile Races, Ranelagh Club.
June 27–July 2	Motor Bicycle Endurance Trial.
July 26–27 ...	Reliability Trials for Motor Boats.
July 30 ...	British International Cup for Motor Boats.
Sept.	*Reliability Trials.
1905.	
Mar. 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

(All French road racing fixtures are subject to confirmation by the French authorities.)

1904.	
May 30–June 3	Circuit National Belge.
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
June 22 ...	Kiel Motor Boat Races.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 15–23 ...	Ostende Week.
July 16–17 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 25 ...	Circuit des Ardennes (A.C. Belgium).
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 8-9 ...	Calais-Dover-Calais (motor boats).
Aug. 10 ...	Calais-Boulogne-Calais (motor boats).
Aug. 14–20 ..	Paris–Deauville Motor Boat Race.
Aug. 22 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Sept. 10-12 ...	Lucerne Motor Boat Races.
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

Those Futile Van Windows.

FROM the first we have highly approved of the County Council bye-law which ordains that the hooded vans which so largely assist in increasing the congestion of our London traffic should have the obstructions at their sides removed, for these hindrances to vision have rendered their drivers "careless as the gods beside their nectar" of what was coming behind them or even passing alongside them. The ordinance, if we remember rightly, was couched in terms to the effect that these vans should be so constructed as to enable the driver to see what was coming along near him on either side, and it was obviously intended that he should be able to protrude his head for the purpose of obtaining information of this kind, to which he has hitherto proved stoically indifferent. But the van drivers of London have determined to retain their Olympian indifference to the London traffic, have construed the regulation of the Council to mean that they might cut little inadequate holes in the sides of the vans and glaze them up. This, as Alderman Smallman said, "might be all right if the drivers had eyes in their elbows." It is not what the County Council meant at all, so we congratulate both Sir David Evans and Alderman Smallman, presiding at the Guildhall, who, after inspecting several of these futile windows, came to the conclusion that they did not meet the requirement at all. There are a number of summonses pending on the subject, so perhaps some day the vans will be made as they ought to be. A further bye-law, to induce their unruffled drivers to pay some attention to the traffic beside and behind them, would be a further right move on the part of the Council. The absurdity of the contrivance so rightly condemned is shown whenever such a van is turning a corner, and the driver does not happen to be completely indifferent to the possibilities of being taken amidships by what is coming behind him. He cannot see out from his window, and still has to poke his head round the corner of his van as, before the introduction of the window, he used on such occasions to do.

Another Anomaly of the Act.

MR. NUTSEY, of the Great Central Garage, has sent us some information in regard to what happened to him recently in a London Police Court, which strongly suggests that we have not exhausted all the anomalies of the wonderful statute of 1903. On April 30th, a driver of the Great Central Garage was convicted for using an unregistered motor car. In reality, we understand, the car was provided with one of the trade-numbers allotted by the County Council, though this, as our readers presently will see, is not the point to which we wish to draw attention. Mr. Nutsey, the secretary to the company, was also summoned and convicted for the same offence. On conviction, the magistrate insisted on endorsing Mr. Nutsey's driving licence, though he was not driving the car nor was on the car. In fact, he was in Paris at the time, and the only way in which he could be made out to be guilty in any sense was as the giver of a general order, in carrying out which an offence had been committed. It can hardly be contended that the framers of the Act really intended licences to be endorsed in such cases. But no option seems to have been accorded to the magistrate provided there is a conviction for an offence under the Act, for it is expressly stated that the magistrate *shall* cause particulars of the conviction to be endorsed upon the licence of the person convicted. We submit that the phraseology of the Act compels magistrates to do what was never intended, and what is preposterously unreasonable in itself. The passages in the Act referring to endorsement of licences is copied from the Hackney Carriages Act, where the intention is, of course, to enable the licencing authorities to learn what particular drivers are unfitted for their occupation and the responsibilities it involves. Similarly, in the Motor Car Act the obvious intention was to show what drivers are unfitted to continue to hold licences for driving, and it ought, of course, to be only in the case of offences of this character that the licence should be endorsed. But that is not how the law stands. With singular contrariety, it makes an exception of first or second convictions for exceeding the speed limit. It is one of the many anomalies in the 1903 Act that will, we sincerely trust, be altered when that Act comes up for review at the end of its three years of existence.

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The French Eliminating Trials.

THE French Eliminating Trials have gone off as successfully as those in the Isle of Man, none of the few accidents having been productive of any serious injury to those concerned. If there have been heartburnings there have been no acrimonious discussions over the results of the trials. This is possibly due to the trials taking the simple form of a race without complications from start to finish.

The result has been to some extent a surprise. A firm which has not previously taken part in a Gordon-Bennett race has obtained the first place. Both car and driver acquitted themselves brilliantly, and if the success of the Richard - Brazier car under the able driving of Thery shows anything, it shows that the race is not necessarily to the highest powered car, but to the car which from start to finish can be relied upon to run through with all its functions unimpaired and always ready to put forth its best pace. The Richard-Brazier car was far from the most highly powered vehicle competing. Its capabilities were estimated at 85-h.p., but it ran throughout without a hitch, had no trouble of any kind, and in consequence, in the picturesque language of a contemporary, "left the road behind it strewn with the failures of more violent competitors." Perhaps the second lesson to be drawn from the event is that the position of no manufacturer is absolutely secure, as far as races are concerned, for the competing Panhard and Levassor vehicles had the worst of luck, owing, it is true, to minor mishaps, but still these mishaps resulted in preventing them from being placed among the winners.

An interesting feature of the trial was provided by the very excellent running of the two Gardner-Serpollets, both of which were placed amongst the first ten, the car driven by Le Blon being fifth, and thus only missing by two places the honour of carrying the French colours in the Taunus. The regularity with which this car ran throughout was admirable, and it attained the highest average speed which a Gardner-Serpollet car has yet reached in an event of similar length.

One impression, visitors to the French Eliminating Trials have certainly carried away with them. At any rate, it is an impression which has been strongly made on a good many of the drivers who competed. It is that the alteration of the rules by which drivers not actually members of the competing clubs, but merely appointed by them, should be eligible, might with advantage be cancelled. The German club, as we said at the time, made a mistake in putting forward this proposal, and we cannot help feeling that it will benefit the future of the Gordon-Bennett Race as an institution if the alteration in the rules be rescinded, and the contest carried on on its original lines. Men who meet as equals as competitors in a race should not belong to widely different classes of society with totally different ideals and traditions, and sport does not benefit by the introduction of the purely professional element into a competition previously confined to amateurs.

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The Value of Scientific Research.

IT is not too much to say that many, perhaps most, automobilists are enthusiasts. At any rate, the leading members of the Automobile Club, whether judges, organisers of events, or members of the various sub-committees, take an amount of trouble and devote an amount of time to various objects designed to promote the progress of automobilism which it would be very hard to find equalled by any other club or even learned society. There are a good many subjects which perhaps hardly come within the scope of such a body as the Automobile Club, or at any rate are of too wide a nature to be tackled by them alone, but these subjects probably only need a thorough recognition of their importance by automobilists and other enlightened members of the general public, and we feel convinced that plenty of volunteers would be forthcoming to render possible the undertaking of the necessary work.

We commented editorially at some length on Mr. Dugald Clerk's James Forest Lecture last week. There is one point in the concluding abstract of it which we publish this week, however, on which we should like to say something further. Mr. Clerk, in one passage, points out that certain researches are indispensable for ascertaining the directions in which the efficiency of the explosion motor may be improved, but he observed at the same time that such work is both enormously expensive and takes up an enormous amount of time—so much so, indeed, that it is quite impossible for any single individual to tackle it adequately.

Now, there is nothing that interests the average automobilist, and, particularly, the automobile manufacturer, more than the chances of increasing the efficiency and power of the engines available for car propulsion, and if the Automobile Club, or some similar body, were to open a fund for research of this kind we feel sure, once the matter were understood, it would be adequately supported by many willing to help both with time and with money. At present the research side of the problem is too much separated from the practical one. If the average automobilist, or even automobile manufacturer, however well disposed to foster the industry, were asked to contribute towards a research into the specific heat of gases at high temperatures he would probably smile at the idea. If, however, he were asked to contribute to the expenses either of an institution, or of a committee on which capable experts were employed and which existed solely for the purpose of improving the efficiency of the internal combustion motor, he would look at the subject very differently. Yet the behaviour of gases at high temperatures is one of the subjects on which it is most important to have reliable data if progress is to be made in increasing the efficiency of the internal combustion engine.

Alcohol is another subject which suggests itself. There is any amount of knowledge still required as to the best methods of employing alcohol as a motive power, to say nothing of its manufacture and denaturation.

It is not only automobilists to whom the conception of such a scheme would appeal, though perhaps it appeals to them more strongly than most, because they are practically acquainted with the triumphs that have been attained by the practical application to the problem of locomotion of existing knowledge. The proposal might ultimately be widened to include the establishment of a national experimental laboratory. Many eminent specialists could be found who would give their time to an advisory board gratis. But it is the sinews of war that are needed as much and perhaps more than anything else, and these both amateurs and manufacturers would probably be found willing to supply once they realised what such a national laboratory could do for them—that it could supply the groundwork and the rough material out of which further industrial progress could be evolved.

In the meantime we have hopes that the scheme may first take shape in regard to those subjects in which automobilists and motor engineers stand most in need of obtaining scientific data, and it is to them that such an undertaking would have the best chances of appealing, for they are progressive and enthusiastic. All that is needed probably is that they should realise the importance to themselves, as well as to the nation, of the interests involved.

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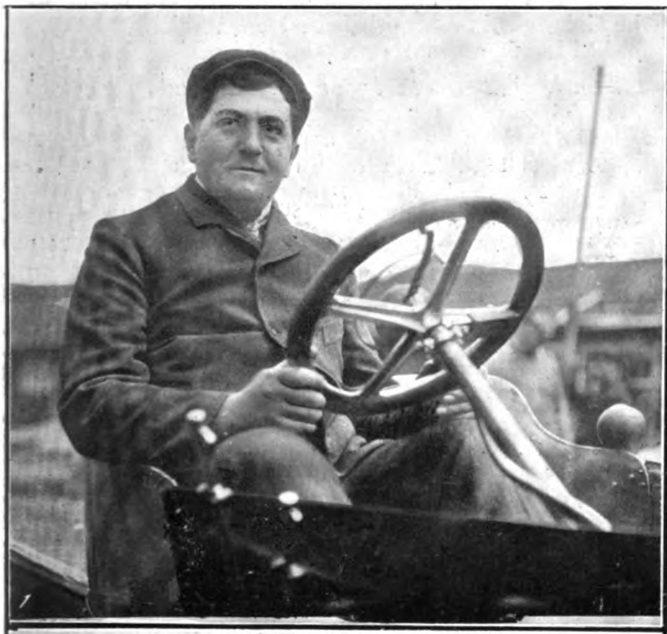
Automobilism in Mining—Ousting the Mule.

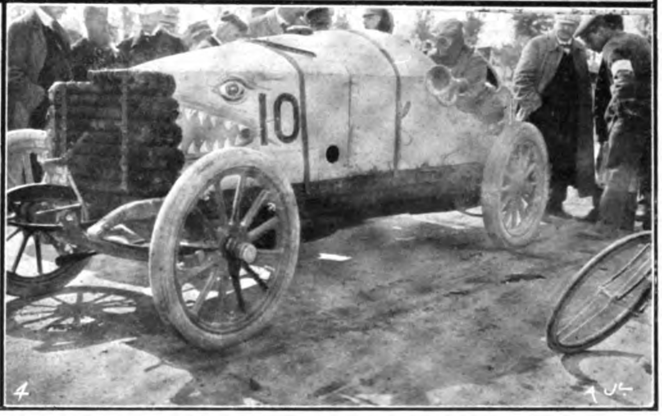
THERE are few more inaccessible regions than the mountainous mining districts of California, and one is glad to learn that the automobile, which is penetrating everywhere, revolutionising traffic, and in consequence developing industry, is finding its way even into the Death Valley, where it will be shortly employed on a large scale for haulage purposes and to replace the mules which have hitherto been regarded as the only practicable traction power in the district. The introduction of the automobile for this purpose has been the result of experiments conducted in Colorado, where it has been satisfactorily demonstrated that motor vehicles can be used to advantage in such districts. The Death Valley is 167 miles long, and hitherto it has taken a 20-mule train 24 hours to haul 20 ton loads 18 miles. Arrangements, according to the *Financial News*, are now being made for doing the work by an automobile train, which will have power equivalent to that of thirty mule teams and will, it is estimated, carry five times the load 100 miles in the 24 hours. The automobiles will be electrically driven, and presumably take current from a trolley-wire. There are to be seven or eight cars to a train, and the electric power will be generated by petrol motors. Whether anything is gained by this arrangement over the employment of separate petrol engines on the cars, is open to doubt, and it is very probable that before long this method of traction will also be adopted. Possibly, however, electric traction has been selected owing to the amount of water-power which is generally available in California, and which may perhaps be applicable for providing additional electric power. The scheme, at any rate, is a further instance of the rapid manner in which self-propelled traction is assisting important industries, even in the most out of the way parts of the world.

The Automobilisation of Donegal.—Our readers will probably not have lost their interest in the important scheme prepared by Lord Iveagh and Mr. Pirrie, for opening up out of the way parts of Ireland, and affording facilities for local produce to be brought in this way to the more important towns. Donegal was to be one of the first counties to be "tapped," but in Ireland, and particularly in Donegal, unexpected obstacles to progress are very frequently to be met with, and it appears that the proposed automobile transport service for Donegal will require modification and strengthening of the bridges, as the motor vehicles which it is intended to employ weigh from 4 to 4½ tons, and are to carry trailers weighing 1 to 1½ tons. It is satisfactory to learn that the Local Government Board of Ireland have been in communication with Lord Iveagh and Mr. Pirrie, and a letter has been written by the Assistant Secretary of the Board to the Londonderry County Council, with the result that the County Surveyor and the Local Government Board engineer are to meet and prepare a report, as soon as possible, as to what work will be required on the routes over which the scheme contemplates running the cars. Bridges are likely to prove a rather serious obstacle to the use of the heavier classes of automobile in many parts of Ireland, but it would be a pity that on this account the inhabitants of those districts should be deprived of all chance of participating in the benefits of the Iveagh-Pirrie scheme, and we would suggest, accordingly, that where for these reasons the heavier vehicles cannot be used immediately, a lighter service might be introduced pending the remodelling of the bridges. However, the local knowledge and enterprise of the promoters of the scheme is so great that practical variations of this kind in its original lines will doubtless be adopted by them as occasion requires.

THE GORDON-BENNETT FRENCH ELIMINATING TRIALS.

MAZAGRAN is one of the most desolate spots in France, situated as it is in the middle of a plain, out of which rises the hilly Argonne (the French Ardennes), houses or dwellings of any kind being conspicuously few and far between. But on the morning of the 20th an unwonted crowd had assembled at the little spot, as early as three o'clock in the morning, having made their way thither from the trains which had disgorged them at Vouziers, Attigny, Rethel and other points near the course. At Rethel, one of the principal controls, equally large crowds were assembled special services of trains having been run with sleeping carriages to enable enthusiasts to be on the spot in time. The leading members of the automobile world were present at one point of the course or another, and the general public was copiously represented as well. In fact, at the principal coigns of vantage, notably the starting point at Mazagran, the crowds were reminiscent of the Paris-Madrid event, and effectively demonstrated that, however inaccessible the neighbourhood may be in which an automobile race is held, the enthusiasm of the French public for events of the kind is certain to ensure a huge attendance. The eliminating trials certainly seem to have excited more enthusiasm in France than any event since the unfortunate Paris-Madrid contest of nearly a year ago. Tremendous interests were at stake, and all the twenty-nine competitors had a fair field and no favour.





1. Thery, who headed the list of competitors in the racing trials on Friday, on his Richard-Brazier Car.

2. Salleron, who came in second, signs the necessary papers on his Mors Car.

3. Thery, the leading speed man, on his Richard-Brazier Car. Mons. Brazier, the constructor of the car, is seated by his side. The tyres employed were Michelin.

4. Rougier, third representative for France, on the successful Turcat-Mery Car, which was decorated in front in such an eccentric manner to represent an alligator. This car also relied on Michelin tyres.

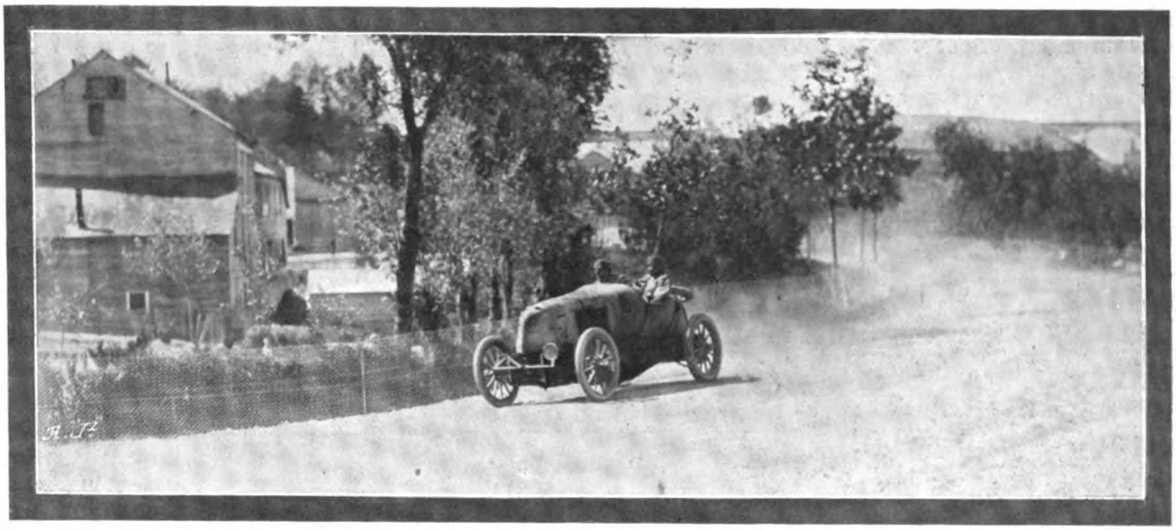
GORDON-BENNETT FRENCH ELIMINATING TRIALS.

Five o'clock was fixed for the hour of the start, and considerably before that time all the 29 vehicles, without a single defaulter, were in position, each more or less surrounded and protected by a little crowd of mechanics and employees of the firm it represented. The torpedo-shaped body had been very generally adopted by the competitors, and this gave an opportunity to someone on the Turcat-Mery staff, who is evidently a humorist, for the pale green nose of one of their vehicles had been adorned with a large eye on either side and a row of fierce-looking crocodiles' teeth. As usual, several of the cars had discarded everything that they could manage to run without, to bring down weight. The Bayard-Clements had their cylinders completely exposed, and the Gobron-Brilliés were literally skeletons, almost every essential feature of the mechanism being exposed to view, while the Darracq cars emulated, to some extent, the performance of their brothers in the Isle of Man by making such a deafening row at the start as positively to frighten a good many of the spectators. Among the drivers Jarrott naturally excited the greatest amount of interest among the British visitors present. He was as quiet and cool as usual, and appeared very confident of doing well. Doubtless he would have obtained a high place had not the water-tank of his car burst, and the water run out, as he characteristically put it, a great deal faster than he could pour it in. Baron de Crawhez, whose chivalrous behaviour in the Gordon-Bennett event of last year has rendered him a particular favourite in this country, perhaps was the next centre of English interest. He was, as usual, as merry as possible, while Rigolly, who has so distinguished himself for short distances at high speed, phlegmatic, as was his wont, appeared in sharp contrast to the highly-excitable Caillois.

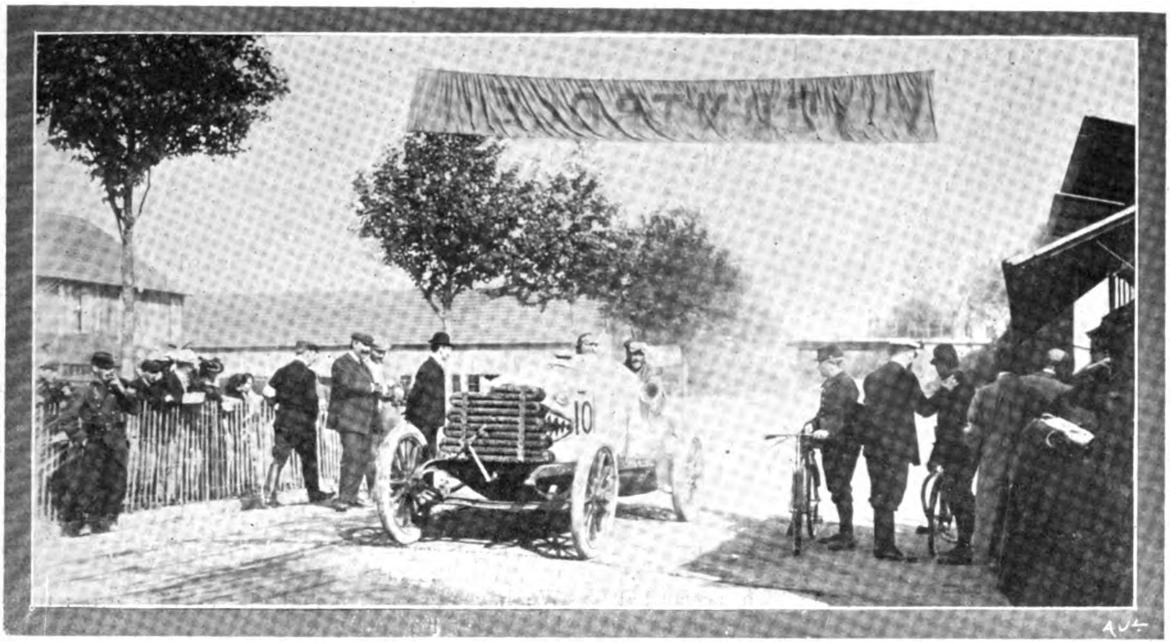
At a few minutes to five Baron de Forest's mechanician started the engine of his De Dietrich car, and the big machine moved up to the starting line. The usual warnings of 10 seconds, 5, 4, 3, 2, and 1, were given and then "off," and the first car shot away in this memorable race to the exact second of five o'clock. The other competitors followed at regular intervals of 2 minutes, and by 5.56 the last of the competitors, Alexander Burton on a Gobron Brillie car, was under way. One of the sensations of the start was provided by Salleron's big Mors, which ultimately obtained second place. The clutch must have been rather fierce, for at the word to go, it executed positively a wild jump forward, a tendency which was exhibited by the other vehicles of the firm, though to a much less noticeable degree.

The starting arrangements were thus carried out with perfect precision and without a hitch.

The first round was successfully accomplished by the great majority of the competitors, 25 out of the 29 completing the first circuit, 22 of them being in good time and going strong. It was during this first round that actually the fastest time for the flying kilometre recorded during the whole day fell to the credit of the Gobron-Brillie car driven by Duray, which it accomplished in 26⅖ seconds, or at the rate of 84·7 miles an hour. In contrast to the provisions of the English Eliminating Trials, this and other similar times taken during the day, though officially noted and of great interest, did not in any way affect the results of the Trial. At the end of this first round the cars which were apparently doing best were Clement junior, on the third Bayard car, Thery on the Georges Richard-Brazier, Salleron's Mors, H. Farman's Panhard, which afterwards dropped out of the running, and Rougier's Turcat Mery, which came in third. But after the first round the unsuccessful competitors began to be eliminated somewhat rapidly. Thus 19 finished the second round, 17 the third round, and only twelve the fourth round. It was on the fourth round that an accident happened to the Hotchkiss car No. 24, driven by Amblard, and was the only really serious contretemps of the race. The axle apparently broke while the car was proceeding at its highest speed, which at once dashed into two poplars by the roadside, broke them off short, and then turned a series of somersaults. Under these circumstances, it is nothing short of marvellous that neither the driver nor the mechanician were seriously injured, though perhaps the statement that, when interviewed in Baron Henri de Rothschild's motor ambulance, they had nothing worse to show than slight scratches, was rather minimizing their misfortune. Baron Crawhez dropped out on the third round owing to troubles with his magneto, which he was not able to get over sufficiently quickly to render it worth while to



GORDON-BENNETT FRENCH ELIMINATING TRIALS.—**Salleron, the second best speed man, taking the corner at Biermes.**

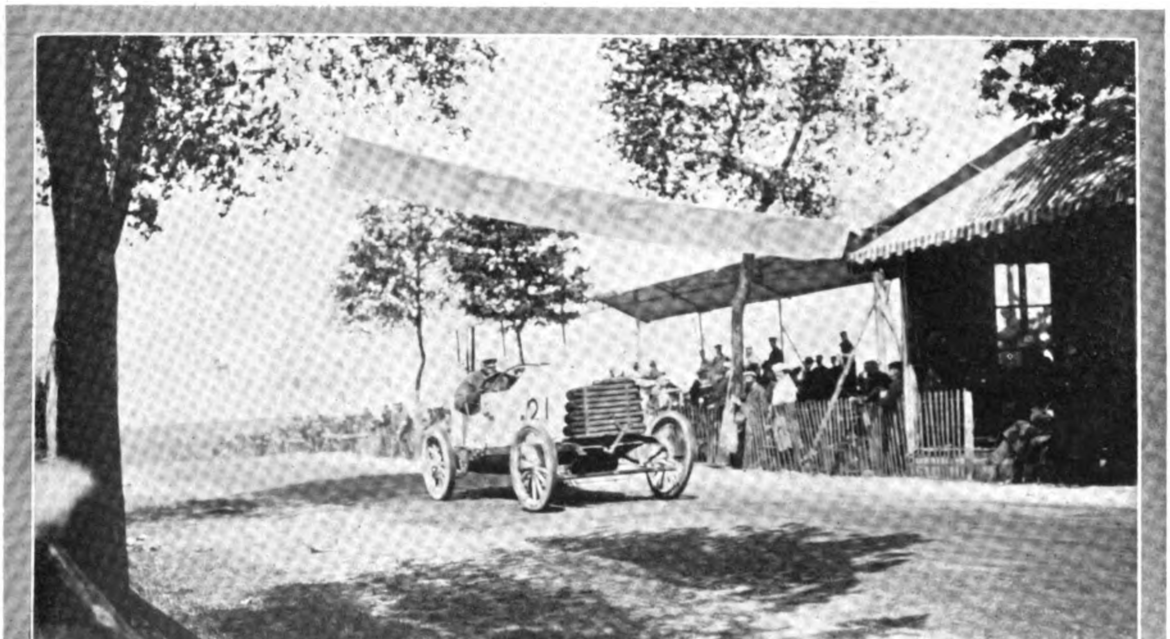


GORDON-BENNETT FRENCH ELIMINATING TRIALS.—Rougier, who secured third place, passing through Rethel Control.

continue the race. Rigolly had a misfortune with his radiator, which caused him to retire, and Achille Fournier had also to abandon his car as the result of an accident at the turning just before Saulces-Monclin. One of the Gobron-Brillié's was put out of action owing the flying off of a tyre, and the other by the leakage of a water-jacket.

Altogether it is difficult to compile an exhaustive catalogue of the various breakages of the 19 cars that were not placed. Parts of the course were fairly strewn with "bits" that no one recognised nor could it be told to what car they belonged.

Owing to ample sprinkling with Westrumite, the course was throughout practically free from dust with



GORDON-BENNETT FRENCH ELIMINATING TRIALS.—Charles Jarrott, who drove a De Dietrich Car, at the Mazagran Control. Jarrott found it useless to continue for the last circuit owing to the impossibility of keeping any water in his tank through a very bad leakage.

great advantage to the drivers and to the great comfort of the spectators. The absence of dust probably enabled better times to be recorded than otherwise would have been the case, though in this respect the conditions were similar in both the British and French Eliminating Trials, though in the Isle of Man the dustlessness was mainly due to natural causes. The course itself, which was a rough square 80 kilometres round, enclosed a number of cross roads which were fairly packed with all sorts of vehicles, from the motor car to the farm wagon, and included cycles, horse drawn vehicles of all sorts and descriptions, besides which, of course, there were an unusually large number of pedestrians.

The salient result of the race itself is the proof it affords that success in racing is no monopoly of firms that have hitherto usually carried off the highest laurels. The result also shows that reliability, regularity of running, and above all complete immunity from breakdowns, is of more importance than enormous power. Nearly all the other competing cars were fitted with engines giving 100-h.p. and more. The winning car, powered at 85-h.p., was one of the least powerful of the lot, but anyone who consults the table of times recorded, which we append below, will see that the regularity of its running was remarkable. Each circuit was accomplished in nearly the same time as every other circuit, and as the time for each was good that brought victory. How far some of the higher powered cars sacrificed car strength to engine power is a question on which adequate data would be interesting.

Till the conclusion of the race the weather proved satisfactory, and when it was over there was a general rush back to Paris both by road and by rail. Happy were those who succeeded in getting home the same evening, for the cars that did not start till the following day were overtaken by such violent rain that many of them sought refuge in Reims, where they passed the rest of the day and the following night. These refugees included MM. De Knyff, Vogué, de Lèon, the Brothers Fournier, de Crawhez, Amblard, Thery, Caillois, Longuemare, and Stead, and their racing cars. We have no doubt heavy rain was mainly responsible for the interruption of the journey at this point, but after so important an event, and particularly as the victor was amongst those detained, it was at least *a propos* that Reims is the centre of the champagne trade, and that the town contains some of the largest champagne cellars in the world.

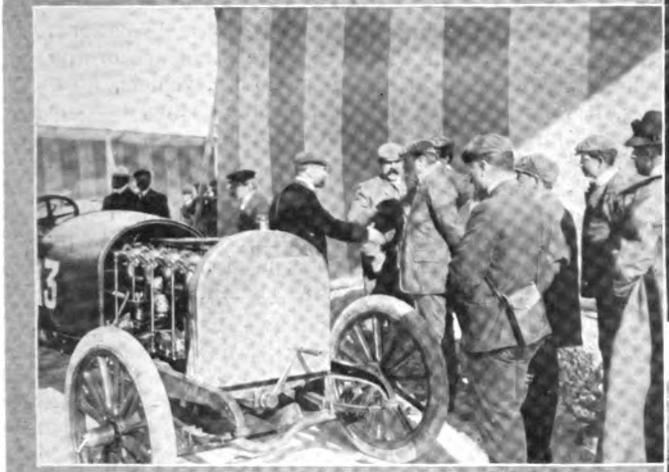
We give below a table of the performances of the competing vehicles from which the leading features and results of the race can be gathered almost at a glance. We have also calculated the average gross times per lap. It will be observed that the three first of these are in accord with the net total times, that is to say, the actual running times, which we give in the extreme right-hand column. But lower down there is a discrepancy between the two orders. This is due to the fact that the times spent by the different cars in the

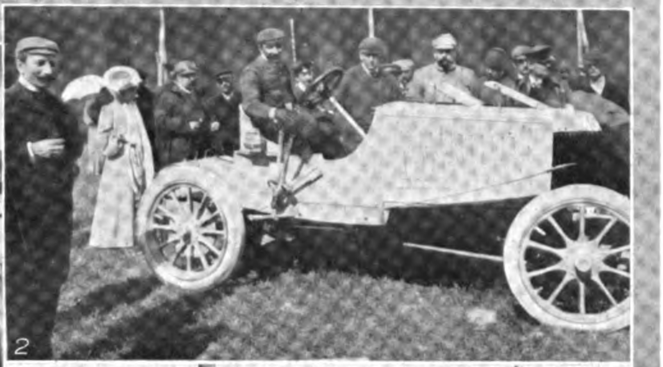
RESULTS AND PARTICULARS OF THE COMPETING CARS.

Official Number.	Description and Driver.	Weight.	Wheel Base.	Track.	Approximate Gross Time occupied in completing the Course (57¾ miles per lap). 1st Lap.	2nd Lap.	3rd Lap.	4th Lap.	5th Lap.	6th Lap.	Approximate Average Time for The Six Laps.	Average Time for The Flying Kilom. =	= m.p.h. over Flying Kilom.	Nett Total Time for the six laps.
		kilogs.	metres	metres.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	secs.		h. m
5	85-h.p. Richard Brazier (Thery)	972	2·60	1·25	1 23	1 19	1 16	1 26	1 23	1 27	1 22	30⅘	72·6	5 20
7	100-h.p. Mors (Salleron)	1000	2·60	1·45	1 21	1 29	1 33	1 24	1 29	1 28	1 27	31⅖	71·2	5 40
10	100-h.p. Turcat-Mery (Rougier)	950	2·72	1·40	1 28	1 27	1 27	1 31	1 25	1 30	1 28	32	69·9	5 45
11	De Dietrich (Gabriel)	990	2·72	1·40	1 28	1 20	1 26	1 35	1 36	1 40	1 31	31⅗	70·8	5 48
6	100-h.p. Serpollet (Le Blon)	991	2·80	1·40	1 35	1 34	1 35	1 35	1 36	1 30	1 34	39	57·3	6 13
15	Richard Brazier (Caillois)	971	2·60	1·25	1 28	1 42	1 20	1 32	1 36	1 40	1 33	31⅕	71·7	6 21
18	100-h.p. Panhard (Teste)	1000	2·50	1·40	1 41	1 32	1 39	1 28	2 10	1 31	1 30	34	65·8	6 40
8	100 h.p. Panhard (Farman)	1003	2·50	1·40	1 27	1 20	1 24	2 2	1 32	2 18	1 40	30⅗	73·1	6 51
26	Serpollet (Pelser)	990	2·80	1·40	1 43	2 0	1 38	1 47	1 38	*	1 37	39⅕	57·1	7 0
3	80-h.p. Clement Bayard (A. Clement)	980	2·45	1·45	1 24	1 22	1 49	2 47	1 25	1 33	1 43	31⅕	71·7	7 11
21	De Dietrich (Jarrott)	984	2·72	1·40	1 41	1 31	1 50	1 28	2 4	—	—	36⅖	61·1	—
25	Richard Brazier (Stead)	980	2·60	1·25	1 40	1 38	1 45	1 29	—	—	—	32⅕	69·5	—
24	115-h.p. Hotchkiss (Amblard)	1004	3·00	1·45	1 38	1 31	1 26	—	—	—	—	30⅖	73·6	—
17	Mors (Leger)	1003	2·60	1·45	1 33	1 23	5 47	—	—	—	—	31	72·1	—
12	90-h.p. Darracq (Beconnais)	1004	2·50	1·30	1 48	1 50	1 46	—	—	—	—	36⅕	61·8	—
20	80-h.p. Turcat-Mery (Touloubre)	1004	2·72	1·40	3 21	1 50	1 36	—	—	—	—	—	—	—
1	100-h.p. De Dietrich (Baron de Forest)	990	2·72	1·40	1 26	1 30	1 49	—	—	—	—	32⅖	—	—
27	Mors (Lavergne)	1000	2·60	1·45	1 37	1 37	—	—	—	—	—	27	82·8	—
4	100-h.p. Hotchkiss (P. de Crawhez)	1004	3·00	1·45	4 39	1 35	—	—	—	—	—	—	—	—
19	Gobron-Brillié (Duray)	990	3·00	1·36	1 49	2 48	—	—	—	—	—	26⅖	84·7	—
29	Gobron-Brillié (Burton)	990	3·00	1·36	1 42	—	—	—	—	—	—	34⅕	65·4	—
28	100-h.p. Panhard (Tart)	990	2·50	1·40	2 16	—	—	—	—	—	—	—	—	—
16	Serpollet (Chanliaud)	990	2·80	1·40	1 38	—	—	—	—	—	—	38⅕	58·5	—
22	90-h.p. Darracq (Wagner)	1004	2·50	1·30	1 57	—	—	—	—	—	—	38	58·8	—
23	100-h.p. Clement-Bayard (Guders)	1000	3·00	1·45	4 56	—	—	—	—	—	—	—	—	—
9	110-h.p. Gobron-Brillié (Rigolly)	998	2·80	1·40	—	—	—	—	—	—	—	—	—	—
13	100-h.p. Clement-Bayard (Hanriot)	1004	2·45	1·45	—	—	—	—	—	—	—	—	—	—
14	115-h.p. Hotchkiss (Fournier)	990	3·00	1·45	—	—	—	—	—	—	—	—	—	—
2	90-h.p. Darracq (Baras)	1004	2·50	1·30	—	—	—	—	—	—	—	—	—	—

NOTE.—The first ten cars in the above table are placed in their order of merit as selected by the committee. The weight limit for cars fitted with magneto ignition is 1,007 kilogs. All the above cars were fitted with magneto ignition except Nos. 3, 6, 9, 16, 19, 26, 29.

* Time for this round not available.





1. Bayard-Clement Car, No. 13, which was driven by Hanriot. On the right are seen Chevalier R de Knyff, M. de la Valette, Georges Prades, &c.

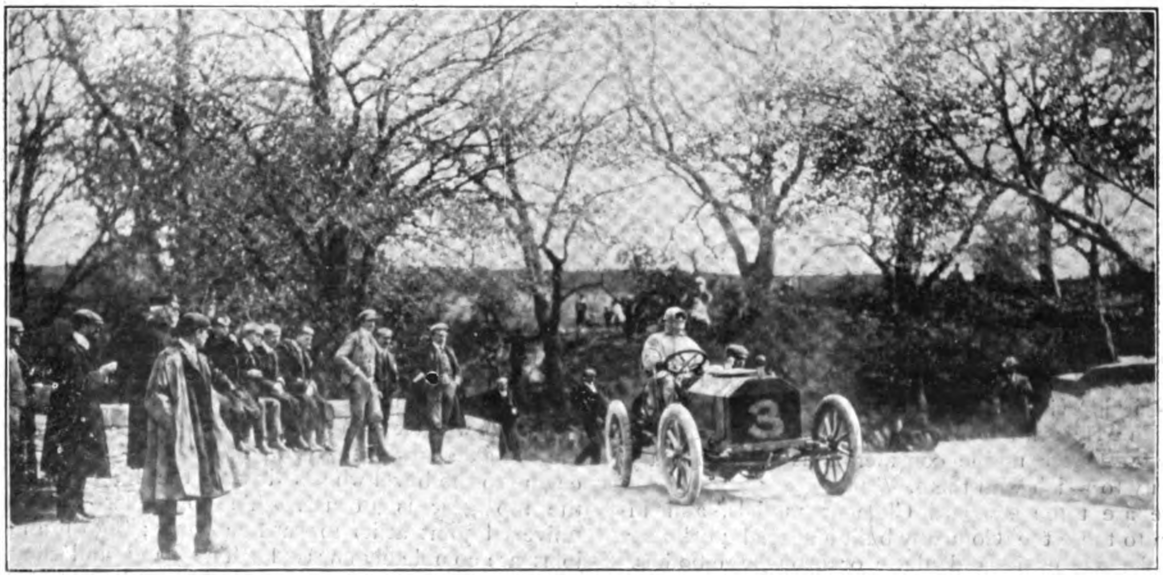
2. Test and his Panhard-Levassor Car, which started No. 18 and arrived 9th, in the weighing enclosure at Mazagran. Both this car and the Bayard-Clement were fitted with Michelin tyres.

3. Elaborate arrangements were made throughout the entire circuit by the Michelin Company for fresh supplies of their tyres. In the above picture is seen one of these "depots" at Vouziers Control.

GORDON-BENNETT FRENCH ELIMINATING TRIALS.

controls have not been ascertainable, and that consequently the average gross time per lap is not in all cases quite what it would be had the control times been invariably the same for each car.

The times for the flying kilometre, which we have averaged in another column, were taken by the electrical timing apparatus over the last kilometre before Mazagran each time the cars came round, but as the apparatus did not always work, some cars were taken half a dozen times, some only once or twice, some not at all. The value of the averages therefore differs considerably, but are nevertheless interesting.



THE ISLE OF MAN TRIALS.—The picturesque Quarter Bridge. J. Hargreaves, in Napier 3, is just passing for his third circuit.

THE 1904 CLEMENT PETROL CARS.

THESE vehicles, which are built by the well-known firm of Messrs. Clement and Co., of Paris, are constructed throughout on well-tried and accepted lines, and are chiefly noticeable for their simple, straightforward design, sound workmanship, and for their silence and smoothness in running. The weight has been kept down as far as possible, consistently with securing ample strength for all the various parts, and care has been taken to render the cars as silent as possible by enclosing the mechanism in oil-tight casings, by employing a good automatic carburettor, and by fitting an effective exhaust box. No attempt has been made to render the Clement cars merely "fashionable," as is shown by the fact that they are not provided with honeycomb radiators, and that the main frames are not constructed of pressed steel. In these and other respects it is evident that the makers have considered the design of the various parts on their own merits, and have not allowed undue considerations of temporary popularity to weigh with them.

There are three standard Clement models, and in addition to these the Company built a special 4-cylinder 10-h.p. chassis to suit landaulette or brougham bodies. The standard types consist of a twin-cylinder 9–11-h.p. car, a 4-cylinder model of 16–20-h.p., and a 4-cylinder vehicle having a 20–26-h.p. engine. All these cars, with the exception of the largest, are of the live-axle pattern, and the engines with which they are fitted are of the well-known Aster make. The 20–26-h.p. vehicle, however, has its rear wheels driven by side chains, and the engine is built by Messrs. Vinot et Deguingand.

The special features of these vehicles, which are fitted with well-built and nicely-finished bodies, are as follows:—The engines have ample power for the work which they have to perform, and are rendered extremely flexible by the automatic carburettor which is used in conjunction with them, and by the adoption of mechanically-operated inlet-valves.

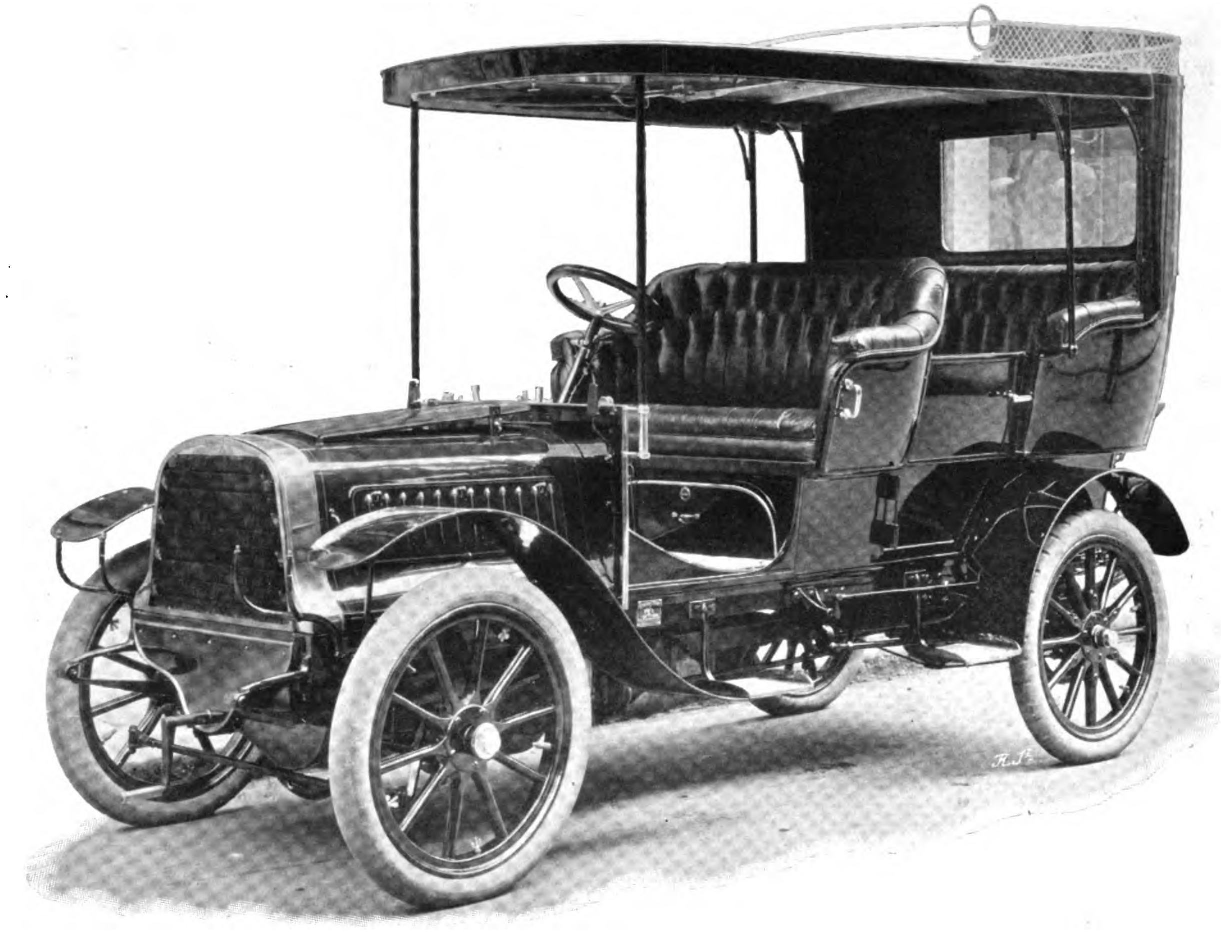


FIG. 1.—A 16-20-h.p. Clement Petrol Car, fitted with double phaeton body.

The engine and the gear-box are carried on an underframe, and are protected beneath by a dust-proof leather casing. The main clutch is of the internal cone type, and is so constructed that no end thrust is imposed on the shafts when it is in use. The change-speed-gear—on the live-axle cars—gives a direct-through-drive from the engine to the bevel wheels driving the differential when the top gear is in use. The propeller-shaft has a universal joint at its forward end only; both it and the joint are completely encased. The hand and the foot-brakes are of a very effective design, and are not only constructed so as to act equally well forward as backward, but so that the bands free themselves entirely from

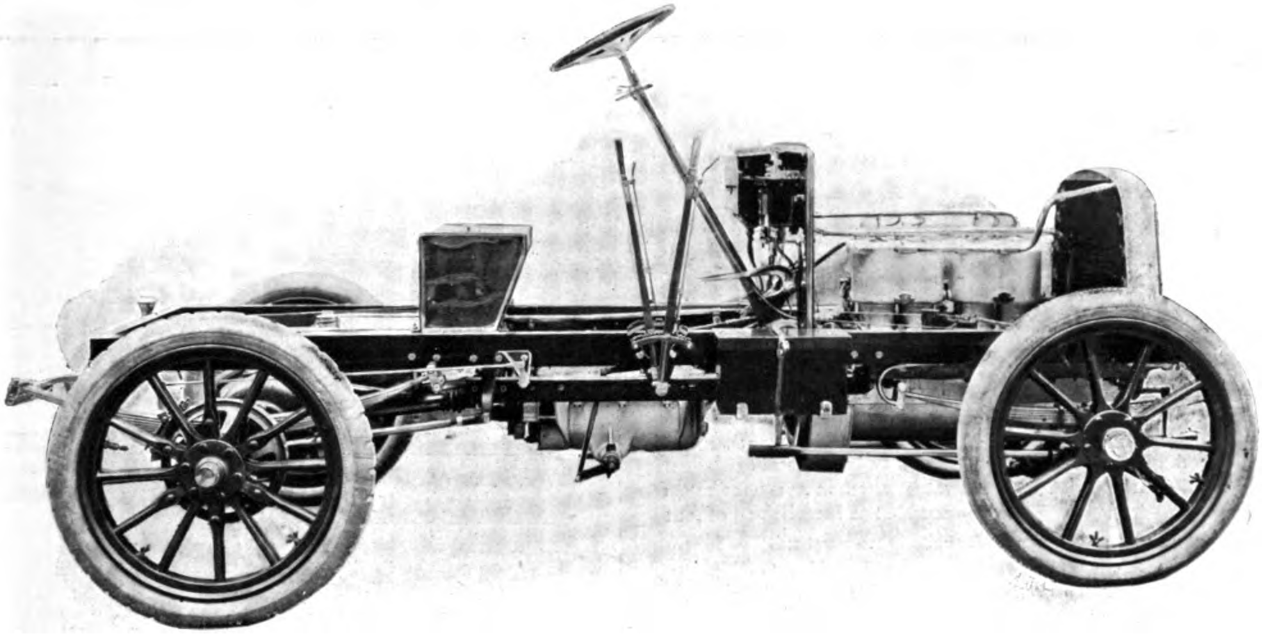


FIG. 2.—View of a 16–20-h.p. Clement Chassis from the "off" side.

the drums when not in use. The radiator, which forms the front of the bonnet, is of the finned type, and does not require a fan of any kind for drawing the air through it. It is used in conjunction with a supplementary water tank, and this tank—like the petrol tank—is fixed direct to the frame, so that it is quite independent of the body.

In general design, the various Clement models are very similar, so that the description which we are about to give of the 16–20-h.p. standard Car may be taken as applicable, in the main, to the smaller vehicles, and—except so far as the substitution of side chains for a live-axle drive is concerned—to the larger carriage also. This 16–20-h.p. car is usually fitted with a tonneau body accommodating up to five people. Its weight empty is about 18 cwt., and it is capable of running at any speed up to about 38 miles per hour. One of these vehicles, having double-Phæton Rothschild body, with side entrances to the rear seats, a canopy top, side curtains, and window-glasses front and rear, is shown in Fig. 1.

The construction of the chassis, and the arrangement of the various parts of the mechanism upon it, are clearly shown in Figs. 2, 3, 4, and 5, which are, respectively, views from the right hand side, from the left side, from above, and from the rear. The main frame, which is rectangular in shape, is constructed of armoured wood, the steel plates

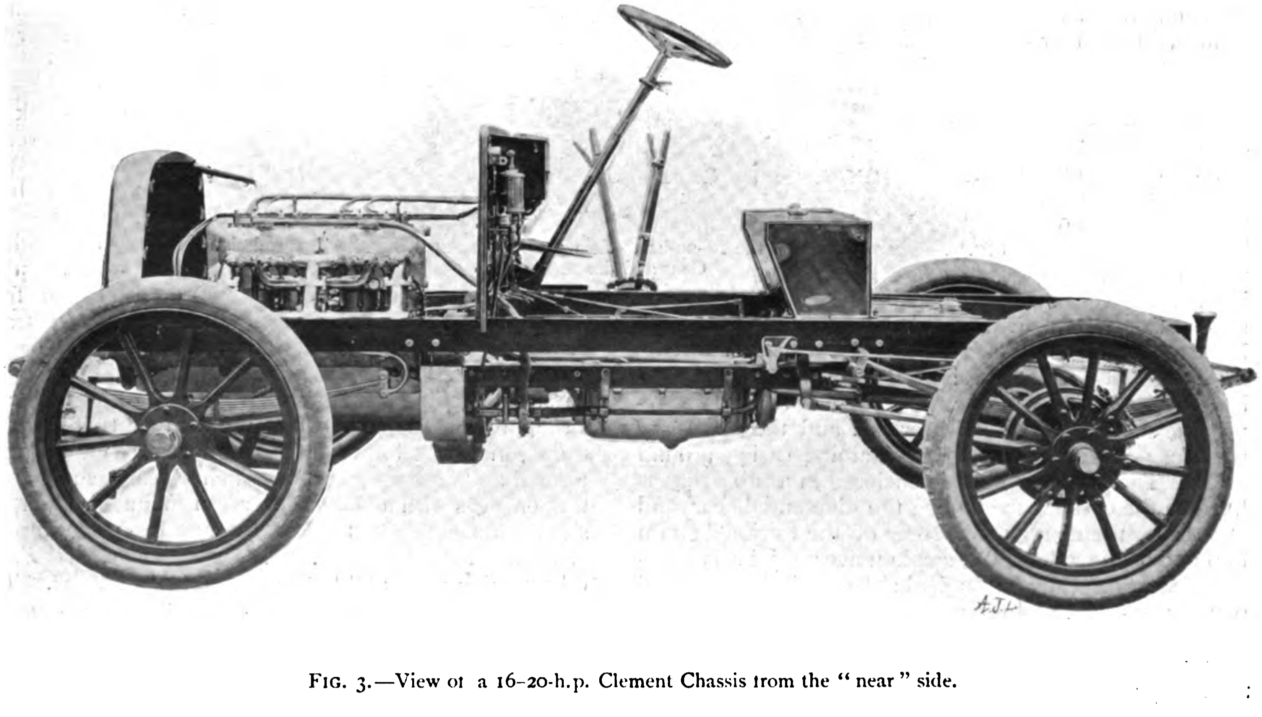


FIG. 3.—View of a 16–20-h.p. Clement Chassis from the "near" side.

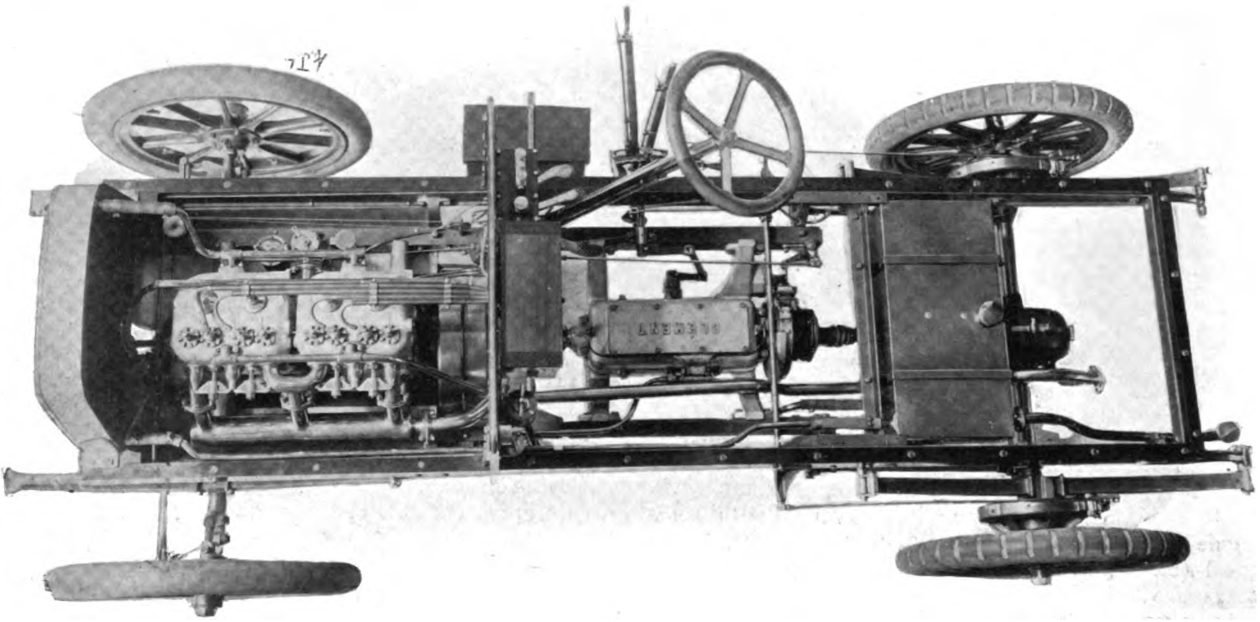


FIG. 4.—View of a 16–20-h.p. Clement Chassis from above (petrol tank removed).

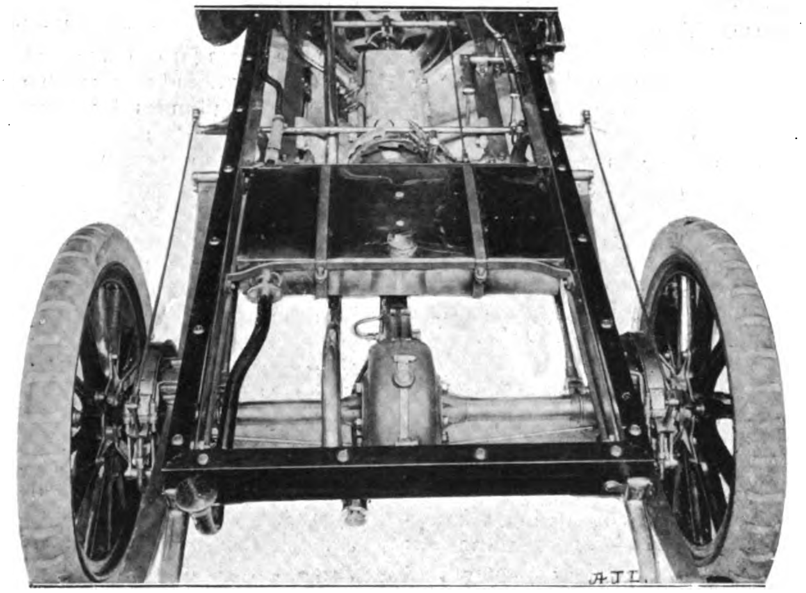


FIG. 5.—Rear portion of the 16–20-h.p. Clement Chassis, showing the Transmission Gear and the Brakes.

lying inside the wooden side members. The underframe for the engine and gear is formed by two angle-steel members that are securely fixed to the main frame by brackets at either end. The frame is suspended in the usual way on long semi-elliptic side springs, the rear springs lying outside it. The front axle is tubular, and the brackets, at its ends, are bifurcated for forming the steering heads. The front wheels run on ball-bearings, and are of the same size as the driving wheels. The live-rear-axle has its revolving shafts, and the bevel wheels driving it, completely enclosed, and the casing is stiffened by diagonal tie-rods on the under side. The revolving shafts run in ball-bearings, and the stationary portions of the axle form an oil-retaining casing around them. The propeller-shaft is enclosed in a tube that is fixed to the casing surrounding the differential gear, and this tube, therefore, takes some of the torsional strain imposed on the axle. The single universal joint is introduced between the longitudinal shaft and the rear end of the gear-shaft, and the axle is also connected with the main frame by hinged radius rods at either side, these rods transmitting the drive to the car and allowing for the free play of the springs.

The wheels are fitted with 810 by 90 mm. tyres, and are of the artillery type. The wheel base is 7 ft. 6½ in., and the track is 4 ft. 2 in. As seen in Figs. 2 and 3, the petrol tank is fixed across the frame, so that it lies beneath the front seat; in Figs. 4 and 5, it has been removed to show the front end of the propeller-shaft, T; the water-tank is seen fitted on a lower level, just in front of the back axle, and the exhaust-box—which was not in place on the chassis from which our photographs were taken—is placed transversely at the back of the car; the filler-cap for the water-tank is brought out behind.

An irreversible form of steering-gear, of special construction, is employed. In it, the inclined tube carrying the steering-wheel at its upper end has a screw thread formed at its other end, upon which rides a square nut that engages with a slotted lever-arm mounted upon the short horizontal shaft, to which the customary steering-arm is fixed. This steering-gear is, as usual, enclosed in a neat oil retaining case, and is fixed to the main-frame. The casting forming the upper portion of the case is formed with projecting brackets that carry the foot pedals.

(*To be continued.*)

THE BURCHALL DOUBLE-ACTING PETROL ENGINE.

THERE are many reasons why it is difficult to design a satisfactory double-acting petrol engine, and although it has been fully realised by many inventors that such an engine might be made lighter and to occupy less room than an engine having the usual single-acting cylinders, yet none of them have hitherto met with any real success. The disadvantages of the double-acting engine of the ordinary type, in which a piston-rod passes through a stuffing-box at one end of the cylinder, are that the piston-rod itself is liable to become excessively hot, that the stuffing-box is difficult to keep gas-tight, that a good deal of friction is introduced by the gland, that the effective area of the two sides of the piston is unequal, and that the length of the engine is considerably increased owing to the presence of the piston-rod and cross-head between the piston and the connecting-rod. The efficient lubrication of the piston is also difficult to obtain on such engines, besides there being a considerable risk that the piston itself will attain so high a temperature as to cause pre-ignition to take place, and, it should moreover be added that the extra weight of the reciprocating parts has the effect of reducing the maximum speeds at which such engines can run. Apart from these many drawbacks, which refer particularly to double-acting explosion engines of the well known steam engine type, there is yet another disadvantage which is apparently inherent in any form of double-acting high-speed engine that may have been or is likely to be designed, and that is, that the connecting-rod is called upon to work alternately in tension and in compression, so that any backlash that there may be in its bearing surfaces becomes considerably more serious, and is liable to cause a bad "knock." We do not maintain that this is a fatal objection, but merely point out that it requires recognition by the designer, and that extra large and adjustable bearings are desirable on both ends of the connecting-rod. It is, of course, significant that in steam-engine practice single-acting engines have largely ousted double-acting engines for high-speed work, but it by no means follows that a double-acting petrol engine should essentially be a failure for automobile propulsion.

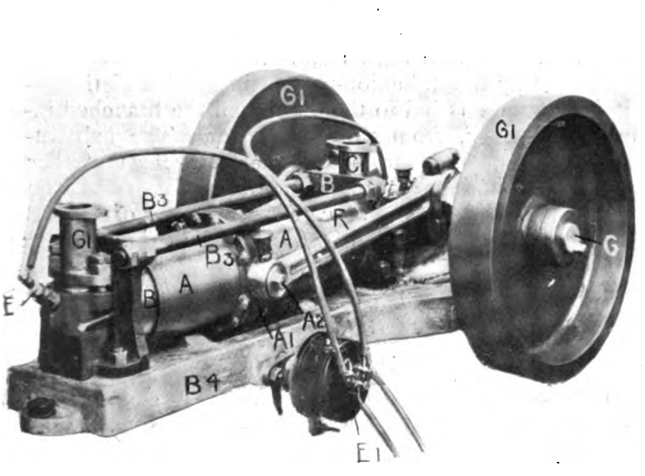


FIG. 1.—Side view of the "Burchall" Experimental Double-acting Petrol Engine.

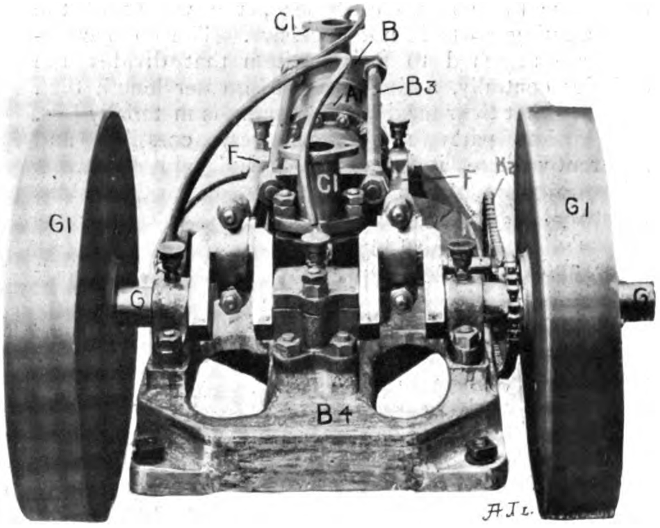


FIG. 2.—View of the same engine from the front.

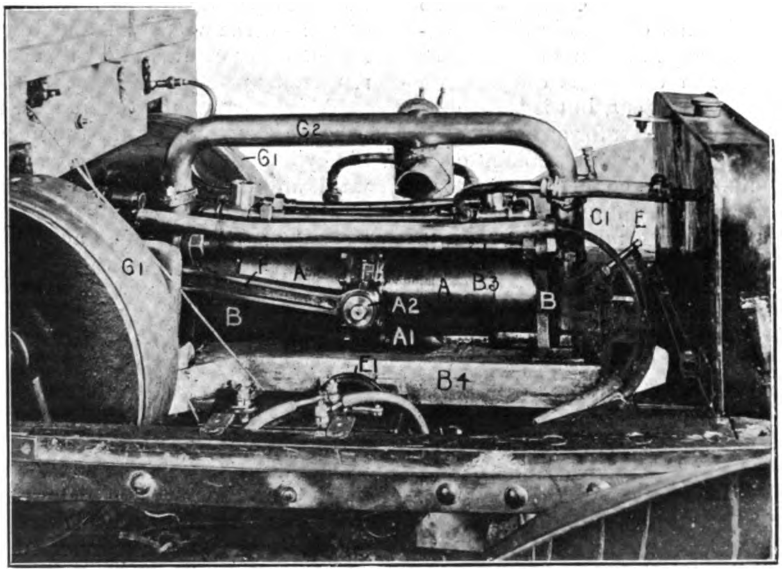


FIG. 3.—The "Burchall" Experimental Engine fixed in place on a car.

The double acting engine that has been designed by Mr. W. B. Burchall, of Bredbury (Stockport), is of particularly ingenious construction and apparently overcomes many of the drawbacks to double-acting petrol engines that have just been enumerated. The engine itself is but slightly longer than a single-acting engine having the same cylinder dimensions would be, and in height and width it is practically the same. Instead of providing a reciprocating piston inside a stationary cylinder, he arranges two stationary pistons in line with one another, and the cylinder reciprocates over them. The pistons also form the combustion-chambers and have the usual valve-chambers provided in them, whilst the reciprocating cylinder is partitioned across centrally to form two entirely distinct compartments, and connecting-rods pass from gudgeon-pins fixed on either side of it to the crank-shaft. By this construction, the usual piston-rod and stuffing-box are entirely eliminated, and, since there is no cross-head, the weight of the reciprocating parts is not excessive. The connecting-rods are attached to the partition that divides the cylinder centrally, and they are of greater length than usual, so that their maximum obliquity is materially less. The various parts are rendered very accessible, and apparently there is but little difficulty in effectively lubricating the large sliding surfaces between the pistons and the cylinder.

The engine operates upon the usual "Otto" 4-stroke cycle, and the stationary pistons, together with their valve-chambers, are formed with large jackets through which water is circulated in the usual way. The valve-chambers have the ordinary inlet and exhaust-valves fitted into them, and much the customary high-tension system of ignition is adopted for firing the explosive charge. So far, Mr. Burchall has built an experimental engine having one double-acting cylinder only, but with it he has been able to conduct a series of very satisfactory experiments, both on the test bench in the shop, and on a motor car on the road. The photographs from which our illustrations are reproduced are taken from this engine, but it is only fair to Mr. Burchall to lay special emphasis on the fact that this particular engine is purely of an experimental character, and is neither so compact nor so neat in appearance as will be his engines in their commercial form. With the single-cylinder engine, impulses are, of course, obtained in both directions during each alternate revolution of the crank-shaft, but it is obvious that the design lends itself even better for a two-cylinder engine, in which regular impulses are obtainable at each stroke, because the same number of connecting-rods are necessary in both cases, and, therefore, the size and weight of the two-cylinder model is materially lessened in relationship to the power developed. A two-cylinder engine, of which we also give illustrations, is now in course of construction, and will, it is anticipated, be put on the market before long.

The cylinders, both of the experimental and of the twin-cylinder engine, have a bore and stroke of 4¼ in., and the normal speed in both cases is 800 revs. per min. The larger engine is expected to develop 20-b.h.p., and its weight, without flywheel, is said to be about 170 lbs. Its external dimensions are:—Length 31 in., width 18 in., and depth 13½ in.

Referring to Figs. 1, 2, and 3, which show the 12-h.p. experimental engine from three different points of view, it will be seen that the cylinder, A, is placed horizontally, and that it is mounted outside the two stationary pistons, B. The cylinder, A, is made of cast-iron, and each half of it is formed with a flange so that the two parts can be bolted together with the partition plate, A^1, between them. The partition plate, A^1, has projecting pins, A^3, standing out from its periphery on either side, and it is upon these projecting pins that the connecting rods, F, are mounted. The piston castings, B, in some ways resemble the cylinders of ordinary engines, for the casting of which they form a part also constitutes the combustion chambers and the valve chambers. The piston portions of castings are turned on the outside and have piston rings fitted near their inner ends. The two castings, B, are bolted rigidly to the cast-iron bed-plate, B^4, so that the two pistons are in line with one another, with their inner ends at the required distance apart. The two castings, B, are also steadied by a couple of steel rods, B^3, which connect their upper sides together. The valve chambers are fitted with atmospherically-operated inlet-valves on the upper side and mechanically-operated exhaust-valves immediately beneath them, whilst the high-tension ignition-plugs, E, are screwed in obliquely, as seen in Figs. 1 and 3. The inlet-valves are held down by the induction-pipe fittings, C^1, and the explosive mixture is led to them through the branched induction-pipe, C^2, from the carburettor. The exhaust-valves are operated from a cam-shaft, K, that lies beneath the engine, and the commutator, E^1, is fitted on one projecting end of the cam-shaft. The cam-shaft, K, on this engine is driven by a chain, K^2 (Fig. 2), from the crank-shaft, G.

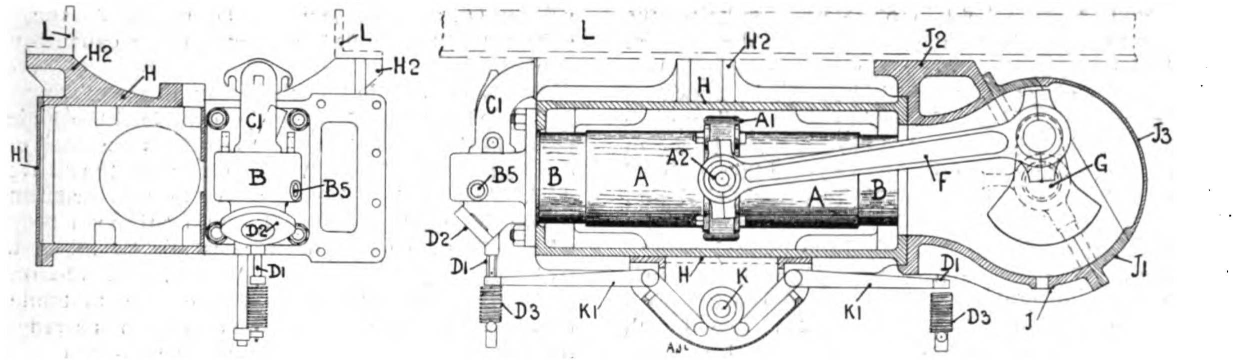
It will be noticed that a large central bearing is provided for the crank-shaft, in addition to the two outside bearings, and that there are crank-pins on either side of it for the two connecting rods, F, to operate upon. The two crank-pins are in line with one another, and the two connecting rods divide the work between them. This particular engine is fitted with two large flywheels, G^1, and was, as seen in Fig. 3, fixed in the front of the car, upon which it was tested in actual practice. The vehicle to which it was fitted had no change-speed-gear, but was geared to the engine through a belt to a countershaft, and by side chains from the countershaft to the road wheels, in such a way that the car would travel at about 20 miles per hour at normal engine speed. The speed of the engine was regulated by an exhaust-valve lifter for the inner cylinder, and this enabled the engine to be rendered single-acting when road conditions permitted.

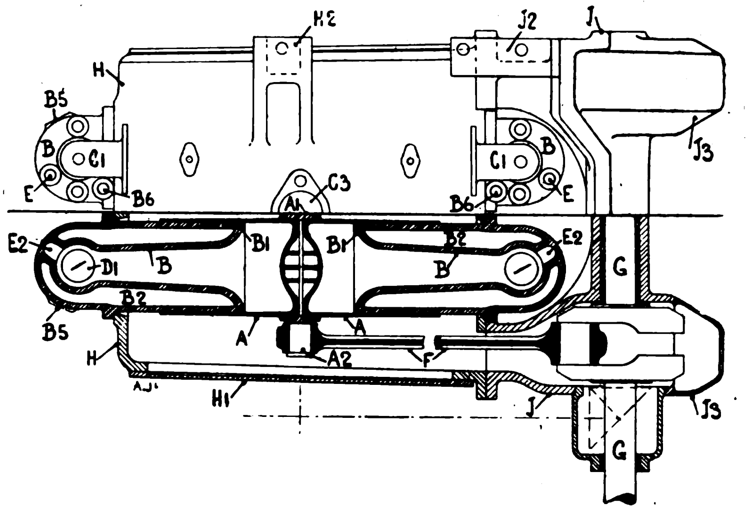
The experimental engine is not shown with any enclosing casing around the cylinders. When in use, the cylinders were largely cooled by their motions backwards and forwards through the air. In the new design, however, all the moving parts of the engine are protected by a dust-proof casing, and the temperature of the cylinders is kept down, to a very great extent, by causing the carburettor to draw its air supply through the casing that encloses them.

The details of construction of the two-cylinder model are well shown in Figs. 4, 5, 6, and 7; these drawings, taken in conjunction with the photographs to which we have already referred, will be found to give a very complete idea of the details of the Burchall engine.

The walls of the cylinder, A, are very thin, and are turned outside as well as being turned and ground true to size inside. They are made of specially hard cast iron, and are closed at their inner ends, as seen in the drawing, Fig. 6. They are bolted on each side of the casting, A^1, which passes right across the engine, so that it holds all four cylinder castings rigidly together, besides providing the two gudgeon pins, A^2, from which the connecting-rods pass to the crank-shaft. Either cylinder casting can be removed without disturbing the others, and the connecting-rods, F, have adjustable bearings at both ends.

Each piston casting, B, is also made of cast iron, and





Figs. 4, 5, 6.—Drawings showing the construction of the Twin-Cylinder "Burchall" Double-acting Engine. Fig. 4.—Half cross section through the main casing, H; half front elevation of one of the stationary pistons, B, fixed in place. Fig. 5.—Longitudinal vertical section. Fig. 6.—Half plan of Engine and half horizontal section through cylinders and pistons.

the water jacket, B^2, formed in it is of large size, and passes around the valve chamber also. The water is led into the jacket at B^5, in the neighbourhood of the exhaust-valve seating, D, and is led out at the highest point through a pipe at B^6. The inlet-valve may be either atmospheric or mechanically operated, and it is held down in place at C by the induction pipe fitting, C^1, in the top of the valve-chamber. Each piston casting is fitted with three rings, B^1, as seen, and the combustion chamber inside this casting is, as will be noticed, of a very unusual shape. The ignition plug is screwed through the top of the valve-chamber at E, and passes down into the pocket, E^2, which is formed for it in the neighbourhood of the inlet-valve.

All four piston castings fit into the ends of the aluminium casing, H, which encloses the cylinders and their connecting rods. This casing is cast open at the sides, and is afterwards fitted with large inspection covers, H^1, which are large enough to allow the cylinders to be passed into position inside. The piston castings fit into registering holes in the ends of this

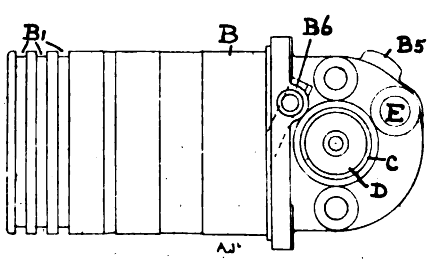


Fig. 7.—Vertical cross section and plan of one of the stationary Pistons.

A	Reciprocating cylinders.
A^1	Carrier casting.
A^2	Gudgeon-pins.
B	Fixed piston castings.
B^1	Piston-rings.
B^2	Water-jackets.
B^3	Steel tie rods.
B^4	Engine base plate.
B^5	Cooling water inlets.
B^6	Cooling water outlets.
C	Inlet-valve seatings.
C^1	Induction-pipe fittings.
C^2	Branched induction-pipe.
C^3	Air-pipe connection on casing, H.
D	Exhaust-valve seatings.
D^1	Exhaust-valves.
D^2	Exhaust-pipe flanges.
D^3	Exhaust-valve springs.
E	Ignition-plugs.
E^1	Commutator.
E^2	Pockets in combustion chambers for ignition-plugs.
F	Connecting-rods.
G	Crank-shaft.
G^1	Flywheels.
H	Casing enclosing cylinders.
H^1	Side cover-plates.
H^2	Lugs for connecting to frame.
J	Lower crank-chamber casting.
J^1	Upper crank-chamber casting.
J^2	Lugs for connecting to frame.
J^3	Inspection covers.
K	Cam-shaft.
K^1	Levers operating exhaust-valves.
K^2	Chain, driving cam-shaft.
L	Angle members of main frame.

The Burchall Double-Acting Engine. Table of Reference Letters.

casting, and are each held in place by four bolts; the holes are somewhat larger than the external diameters of the cylinders, A, so that after removing the rear pistons, and the connecting rods, the cylinders can be drawn off the front pistons, without disturbing them. There are two large slots in the front end of the casing, and through these the connecting rods pass into the crank-chamber.

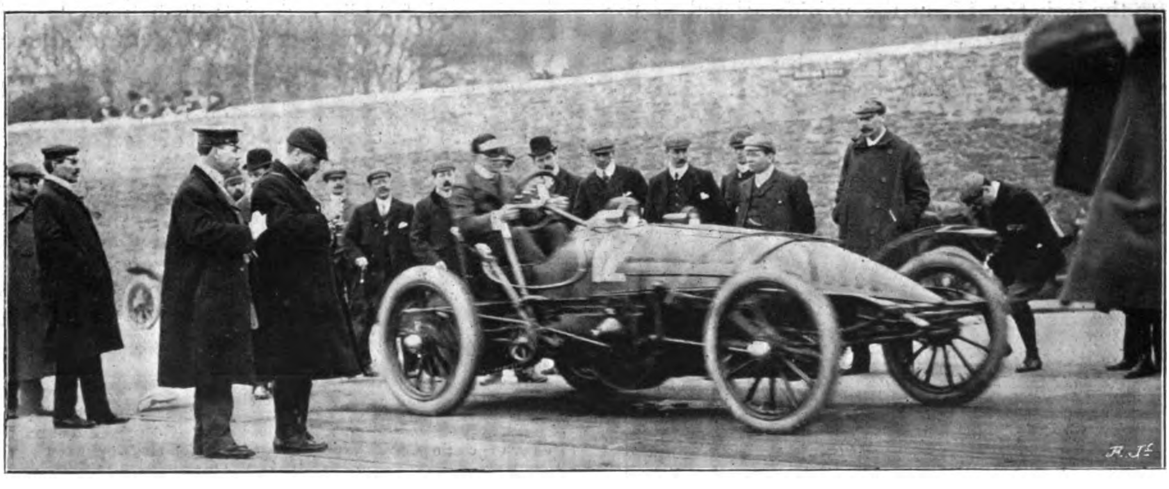
The crank-chamber is formed of two castings, J and J^1, which are fitted together with a diagonal joint that passes through the centre of the main bearings. The casting, J, registers over the casing, H, to ensure correct alignment of the crank-shaft with the cylinders and the pistons, and this casting is also formed with brackets, J^2, on top, by which it can be bolted in place on the car; the engine is intended to be fixed beneath two longitudinal members, L, of the main frame, and is also secured to these members by the lugs, H^2, formed on the casing, H. Inspection of each portion of the crank-chamber is provided for by the detachable covers, J^3, and it will be seen that there is a very long bearing for the crank-shaft, G, between the two cranks.

The position of the cam-shaft, K, on this engine is seen in Fig. 5. It is placed transversely beneath the centre of the casting, H, and is driven by bevel-gearing (indicated only in the drawings) from the crank-shaft. It is carried in a separate casting in which are fitted the pivoted levers, K^1, for operating the valves, and is fixed in such a way that the whole of this gear can be removed together with it easily. By the arrangement adopted for the levers, each cam is enabled to operate the corresponding valves at opposite ends of the same cylinder, so that, even when the inlet-valves are controlled mechanically, it is only necessary to fit four cams for all eight valves. In Figs. 4 and 5 the pivoted levers, K^1, are seen in connection with the exhaust-valves, D^1, ; in these views D^3 represents the valve-spring, and D^2 the flange to which the exhaust-pipe is connected.

Provision is made for lubricating all the moving parts, and drips are arranged for the cylinders, the gudgeon-pins and the crank-shaft; special guides are fitted on the cylinder-carrier casting, A^1, for distributing the oil over the working surfaces. The air supply for the carburettor is drawn through the casing, H, and out through the port, C^3, at the top; its temperature is slightly raised whilst passing around the cylinders, A, and it serves to prevent them from getting too hot. The engine is intended for cars in which the transmission mechanism is arranged as on the well-known Wolseley vehicles — with a chain drive from the clutch on the crank-shaft to the first motion-shaft of the change-speed-gear.

It will be seen, from the above description, that this ingenious engine is free from most of the disadvantages which have hitherto been associated with double-acting cylinders, and that Mr. Burchall's design has many good points to recommend it. It is possible to arrange the cylinders so close together that four could be placed abreast on an ordinary chassis; with four cylinders of this kind, an impulse would be obtained at each half revolution of the crank-shaft, giving the same result as an ordinary eight-cylinder engine.

At first sight it would appear as though the surfaces of the combustion-chambers were considerably larger than in existing engines, and in this case the efficiency of the engine would be diminished and a larger radiator would probably be required on the car. Mr. Burchall, however, states that although the surface is larger than on most horizontal engines, yet it is not as great as on many vertical engines now in use. We shall watch the future performances of his engines with no small interest.



THE ISLE OF MAN TRIALS.—Charles Jarrott gets away smartly on his Wolseley "beetle," at the Douglas Speed Trials. Mr. H. Austin is on the extreme left of the photograph.

WE have received Part I. of a "Technological Dictionary," edited by G. F. Goodchild, B.A., and published by Geo. Newnes, Ltd., price 1*s*. The present volume gets as far as about half way through "B." The work when finished promises to be singularly complete and satisfactory. The explanations of all technical terms (and they are understood broadly), including even terms of ancient architecture, are short, terse, clear, and in general extremely accurate. Altogether the publication ought to prove of value to technologists generally. It would of course be extending the scope of the work to add foreign equivalents of the principal terms, but it would also add greatly to its value, and perhaps we may hope to see this addition made in some future edition.

RACES, RECORDS, AND TRIALS.

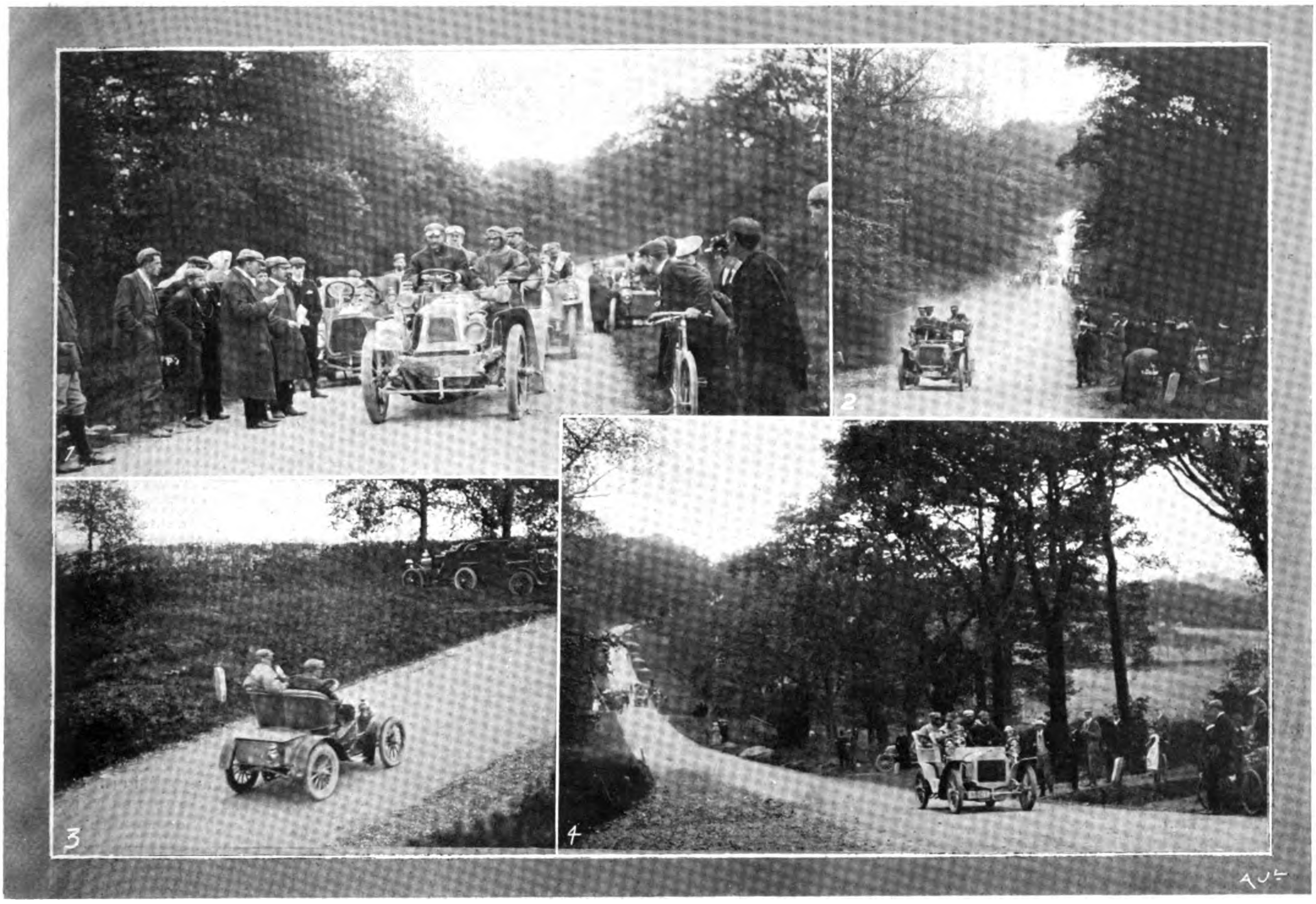
THE GLASGOW-LONDON RUN.

The Scottish Western Section made a new departure in the arrangements for this event in having the cars on view to the public on the day preceding that of the start. Of the 31 cars entered 30 drew up in line at Rennie and Prosser's Garage in Henderson Street, the odd car, a Spyker, having been withdrawn two days before.

Thursday morning in Glasgow did not look promising for a pleasant run. Heavy rain had fallen during the night, and when about five o'clock the cars lined up to their marks in St. Vincent Street, heavy rain-laden clouds still hovered over the "dark sea-born city." The 30 cars presented a very fine appearance, but the considerable crowd which assembled to see the start prevented them from being seen to the best advantage.

Sharp to time, the first car, a Sunbeam, moved off, and in less than a quarter of an hour all were started. The route, by Buchanan Street, Argyle Street, and Gallowgate, was crowded at various points to see the departure of the competitors, an effect produced by the comparatively late start.

The roads outside the city were found at first to be somewhat greasy, but they rapidly improved and before the first control was reached were quite dry and in admirable condition. The motor car has reached such a high state of efficiency that a mechanical non-stop run over such a course is not considered anything of a feat; and the drivers have now nothing left but to speculate on their luck with tyre trouble, and make sure that the fellow, who, according to order of starting should be behind, does not get ahead at the controls. The writer was privileged to have a seat in the 16-h.p. Maxim, and was thereby enabled to witness the most thorough system of timing that he has seen, a system which, bar misfortune, would have brought the car from the position of twenty-fourth well up for first place in London. But, it may be asked, what benefit is to be derived from being first? First or last place makes no difference so far as the awards are concerned, provided the maximum time be not exceeded. This is very beautiful theoretically, but does not work out in practice. The fact of arriving first in London, provided the conditions of the contest are complied with, carries with it an advertisement of nearly as great value as the award of a gold medal. This digression was suggested by the recollection of the cars crawling into the control at Douglas Mill. Crawling at such points has been a feature of past contests, but the new rule, making a loss of marks follow too early an arrival at the end of a stage, appeared to give it greater prominence than in the past. Leaving Douglas Mill, the route led over the bleak upper lands of Lanarkshire where the unfenced road has black and white painted posts at intervals to indicate its course during the deep snow period in winter. But the sun came through, bright and warm, and as we rushed along through the sharp morning air the bare surrounding landscape had



1. No. 3, a 14-h.p. Renault, 1904 model, entered by the Roadway Autocar Company, Limited, which secured a Non-Stop Certificate, waiting for the word to start.

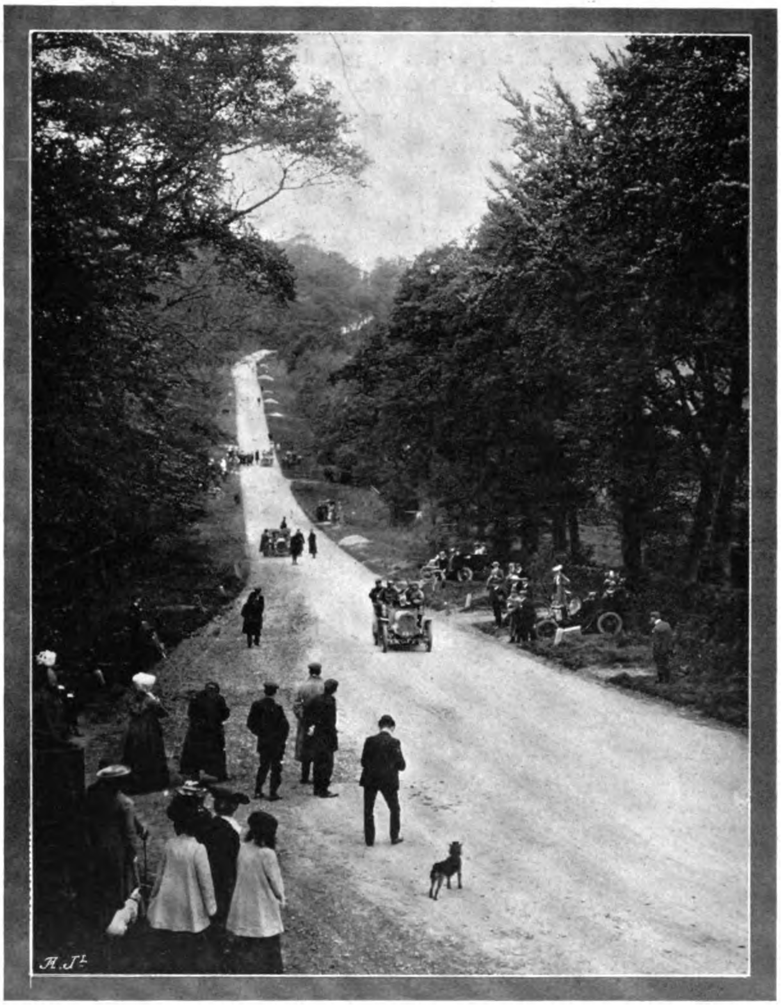
2. The 12-h.p. Eagle light car which secured a Non-Stop Certificate (No. 12), off up the hill with a good start.

3. The 6-h.p. light Wolseley Car (No. 26), which secured a Non-Stop Certificate, taking easily the stiffest part at the top of the hill.

4. A good view of the Hill. The 12-h.p. Siddeley Car, No. 17, is seen about half-way up.

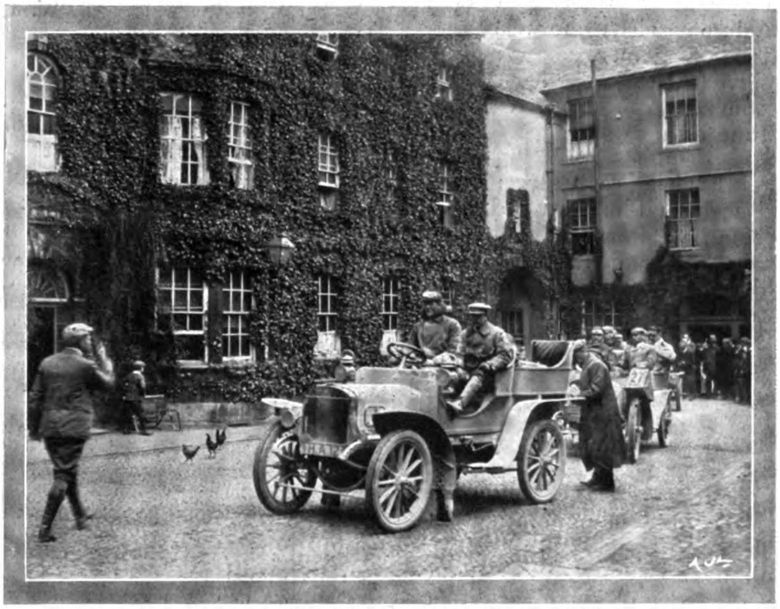
GLASGOW-LONDON RELIABILITY TRIAL.—The Woodcock Hill Climbing Test at Elstree.

no depressing effect. Over Beattock and down the Valley of the Nith, past many small droves of lambs making for Lockerbie Fair, the cars proceeded at a good pace. We found ourselves in company with the Thornycroft, the Baudouin-Deschamps, De Dion, and others, but of the earlier starters we saw nothing till lunch time. Before starting we were informed that meeting a small blue Panhard car would imply the presence of a police trap, but in its earnest desire to play the part of voluntary scapegoat the small blue Panhard must have exerted itself beyond its powers, for we passed it side-tracked for repairs, the only mechanically afflicted car seen during the day. After Gretna it was a scamper "o'er the Border and awa'" for Penrith and lunch, a proceeding penalised afterwards by the inevitable crawl, of somewhat longer duration than usual, into control. In the Market Square, Penrith, we found Mr. J. R. Nisbet, marshal-in-charge, arranging the cars to permit of their departure in the order of arrival. The event had evidently been noised abroad, and the square was crowded with townspeople and country folk anxious to examine at close quarters the new means of road travel. Fifty minutes after its arrival, each car deployed out of the town and started away for the top of Shap, but usually at a leisurely gait. The time had been intentionally lengthened to test the cooling systems of the cars on a long crawl, and the trial was a real one. The ascent of Shap from the north is gradual, but of this some of the drivers were not aware, and thinking the long time had been given for the slow ascent of a stiff hill on the low gear, they covered the first part of the control at considerable speed, only to have the longer crawl towards the finish. This was the only control in which the arrangements did not work out perfectly, the banners, through a misunderstanding, having been fixed before the summit was reached instead of on the southern side of it. Only one or two cars were inconvenienced by the mistake, however, as the gentleman who had kindly volunteered to fix them mounted the hill at express speed when the error was discovered and put them right.



GLASGOW-LONDON RELIABILITY TRIAL.—The Woodcock Hill Climbing Test at Elstree. A general view of the Hill. The car coming up is the 16-h.p. Argyll, which secured a Non-Stop Run Certificate.

From Shap Summit to Kirkby Lonsdale is nearly 23 miles, and as the time allowed was 1 hour 12 mins. the average speed demanded was well on for the legal limit. But caution had to be exercised in the descent from Shap, so that when the level was reached, good speed was not only permissible but necessary if the minimum time were to be approached. This was the quickest stage of the run, and as such was apparently intended to be part of the test. A crawl up Shap and consequent boiling water, then a fast run to test the engines while hot. In the square at Kirkby Lonsdale there was no necessity for direction indicators. A crowd of people, all anxious to point out the sharp right turn, awaited the coming of the cars. These worthy people must have wondered what sort of a race it was, anyhow, as we literally crawled down the hill into the town. From Kirkby Lonsdale to Skipton was the longest stage of the first day, and as the time allowed was reasonable, an hour and three-quarters for 33 miles, including some steep hills, the run would have been enjoyable but for the expectation of police traps. These were present right enough, but as they were known to be planted towards the end of the stage, the first part was taken at good speed followed by a diplomatic crawl over the suspected portion. The wisdom of this course was justified. A large touring car passed us at something over 20 miles an hour and we agreed that it would probably be seen again. It was. Near Settle, after the descent of a steep hill, a tempting stretch of comparatively level road had been measured off, and here the tourist was stopped. In one way the police had over-reached themselves, however, as the end of the trap could be seen from the hill, and the car standing by the roadside formed a sufficient warning to succeeding drivers. The last stage of the first day from Skipton to Leeds was undertaken under less favourable weather conditions, for the day had been beautifully fine the greater part of the way. Dark clouds now hung about to the south, and between Otley and Leeds heavy rain fell. The Maxim had been running splendidly and with great regularity, and, with only 15 miles to go, a non-stop to Leeds was all but assured. But "the best laid schemes, &c.," and while the heavy rain was at its worst, a suspicious lurch attracted attention to the rear left tyre, which had punctured. Twenty-five minutes devoted to repairing damage done by a flooring nail had to be added to the minimum time, and it was, consequently, close on 7 o'clock when we drew up at the entrance to the garage at Leeds. Here we learned that the 24-h.p. Eagle and the 18-h.p. Renfrew had been withdrawn, but that the other cars were all apparently still in the contest. The first car to reach Leeds was the 16-h.p. Argyll, followed by the 10-h.p. Ryknield, the 16-h.p. Sunbeam, 12-h.p. Gladiator, 14-h.p. Renault, 10-h.p. Argyll, 6-h.p. Wolseley, 12-h.p. Eagle, 24-h.p. Delahaye, 20-h.p. Thornycroft, 12-h.p. Siddeley, 28-h.p. James and Browne, 12-h.p. Richardson, 16-h.p. Rochet-Schneider, 12-h.p. Arrol-Johnston, 16-h.p. Maxim, 12-h.p. Sunbeam, 18-h.p. Siddeley, 12-h.p. De Dion, 12-h.p. Pipe, 16-h.p. Martini, 8½-h.p. Humber, 6-h.p. Vauxhall, 12-h.p. Argyll; the remaining cars, the 6½-h.p. Cadillac, 6-h.p. Cruan, 8-h.p. Vulcan, and 18-h.p. Baudouin-Deschamps arrived later, the last nearly at ten o'clock. With the two cars withdrawn, the thirty starters were therefore accounted for. Messrs. Adam and Smith, chairman and hon. secretary of the Western Section, attended to the bestowal of the cars, and it was a tight fit to get them all into the hall, but it was effected at last. Of the twenty-eight cars assembled in the Drill Hall, all but one started the next day, the 18-h.p. Baudouin-Deschamps, and as the French crew had given no intimation of their intention to withdraw, the Trial officials were considerably inconvenienced, including the loss of breakfast, by their failure to turn up.



GLASGOW-LONDON RELIABILITY TRIAL.—Competing cars entering the George Hotel Garage on their arrival at Stamford, the first stop after leaving Leeds, on May 20th.

Friday morning broke cold and grey, but the feeling was that the day would be fine, and so it proved. Four o'clock rising is not a joyful experience, and when it comes two mornings running it annoys. It is the penalty of motor events, however, and must be borne. Cold water has a surprising power of driving sleep and—well—fumes out of the head, and its vivifying effect, followed by that of hot coffee, soon established a more hopeful frame of mind, a less despairing view of life. Half-past four o'clock in the Queen's Hotel, Leeds, might have been taken for four or five hours later, so bustling and animated did the place seem. But there could be no dallying over breakfast, however satisfying such a proceeding might be to one's appetite, and well before half-past five found us at the Drill Hall, and here things were already looking lively. St. James's Street, Leeds, is somewhat steep, and it was, therefore, decided to run the cars into position in charge of the drivers. They were quickly run into their places, and six o'clock had just struck when the Argyll was sent away, the other cars following in the order of their arrival. Between Leeds and Pontefract, a thick fog-bank was run into, and the progress was consequently slow, and wisely so. We were running last of three cars in close order, of which the 10-h.p. Argyll was the leader. Suddenly a gate loomed up through the fog, and only a sudden wrench round of the steering-wheel prevented disaster. Fortunately the fog did not last long, but while running through it, we recognised that there are circumstances which sometimes make the rear position desirable. This opinion was reversed later on, when we got among the dust, and we had not long to wait for it. The weather turned out bright and fine, and as we bore away for Doncaster, and on to the Great North Road, the cars running in open order raised a cloud of dust which indicated the turnings of the road for miles. The running was monotonous in its regularity, no punctures, no breakdowns, even the horses and cattle are becoming so accustomed to motor cars that the excitement of seeing them try to climb walls and hedges was denied us.

There were no incidents to make the run interesting, and we seemed all to get into Stamford in good time for lunch. The proceeding at Penrith was repeated, but in addition the cars were weighed on the railway weighbridge with their full loads to meet one of the hill-climbing formula requirements later. Nothing occurred until the hill was reached. Here matters were expeditiously carried through, and having surmounted the short steep hill it was off to Barnet and then away for Piccadilly. Between Elstree and Barnet the dust was at its worst, resulting from the narrow road and the high hedges preventing the wind taking effect. The Automobile Club was reached a few minutes after six o'clock, the Maxim maintaining till the finish its steady well-directed pace.

The arrangements made by the Western Section committee were admirably conceived, and with the trifling exception at Shap, were well carried out. So far as we could learn, the police gave the competitors no trouble, an examination of numbers at Hatfield, without stopping the cars, being the only interference on their part. The only delays to cars, witnessed by the writer, were a short stoppage of the 12-h.p. Siddeley for some trifling defect before leaving Leeds, a puncture by the Gladiator, and a stoppage for petrol within a mile of Stamford by the Delahaye.

The first arrival, the 10-h.p. Argyll, was driven with great judgment by its young driver, and both he and his youthful mechanic, a lad of sixteen, deserve great praise for their intelligent observation of the requirements of the contest. One of the sensations of the trial was the admirable running of the 6-h.p. Wolseley. This little car held its own right through the run with those of larger power, and was also admirably driven. There was, indeed, something gymnastic about its driving, for on one or two occasions when we passed, the driver was steering with one hand while he leant forward and with the other raised the bonnet to watch the working of some part of the mechanism. We ran a considerable part of the second day in company with the Richardson, the Renault, the 12-h.p. Eagle (only two-seated curiously enough), and the Arrol-Johnston. These cars ran with great regularity, and although the last did not show great speed on the hills, it has to be borne in mind that the motor is only 12-h.p., and that the car carried six passengers. All the twenty-seven cars to leave Leeds arrived, and twenty-five of them were at the club within three-quarters of an hour of the minimum time expiring, the remaining two being less than an hour later.

From the British makers' point of view, the trial was highly satisfactory. Sixteen of the thirty starters were of British make, and fourteen were foreign, yet of the eight non-stop records, according to a preliminary scrutiny, seven are British, and only one, the Renault, is foreign.

The writer cannot close this notice without expressing his high appreciation of the courtesy and consideration shown him by Mr. Woolf, of the London General Automobile Company, the entrants of the Maxim car, by whom a sometimes not entirely agreeable duty was made easy and pleasant.

He is unable, however, to pay a similar compliment to the A.C.G.B.I. Some of the observers undertook the duty at considerable inconvenience and no little discomfort. On their arrival in London they were entitled to expect that fitting accommodation should have been provided, to enable the records to be completed in quietness and comfort. It would, presumably, have been too much to expect admission to the sacred precincts of the club-house, but some place other than the hole into which they were packed should certainly have been found for them. A. F. S.

After inspection of the Observers' sheets, it is officially announced that the following cars have been granted "non-stop" certificates:—

CLASS A.—*Cars having 1 Cylinder.*—No. 26. 6-h.p. Light Wolseley.

CLASS B.—*2-cylinder Cars.*—No. 4. 10-h.p. Argyll; No. 12. 12-h.p. Light Eagle; No. 13. 12-h.p. Arrol-Johnston.

CLASS C.—*3 or more Cylinders.*—No. 3. 14-h.p. Renault (1904); No. 14. 12-h.p. Sunbeam; No. 20. 18-h.p. James and Browne; No. 25. 20-h.p. Thornycroft.

Times on Woodcock Hill (710 ft.). This hill climb is only one of many factors governing the awards:—

Class A.	Min.	sec.		Min.	sec.
6-h.p. Vauxhall ...	1	29⅕	8-10-h.p. Vulcan* ...	——	
6½-h.p. Cadillac ...	1	3⅕	*Class C.*		
6-h.p. Light Wolseley	0	50⅖	16-h.p. Sunbeam ...	Failed.	
Class B.			14-h.p. Renault ...	0	45⅘
12-h.p. Gladiator ...	0	59⅕	12-h.p. Argyll ...	5	18
10-h.p. Argyll ...	0	58	16-h.p. Argyll ...	0	42⅖
10-h-p. Ryknield ...	1	41	16-20-h.p. Martini ...	0	32⅕
12-h.p. Richardson ...	1	5	12-h.p. Sunbeam ...	0	45⅘
12-h.p. Eagle Light ...	0	55⅕	12-h.p. Pipe	0	43⅘
12.h.p. Arrol Johnston	1	23⅘	16-h.p. R'ch't-Sch'n'dr.	0	41⅖
12-h.p. Siddeley ...	0	58⅘	24-h.p. Delahaye ...	0	34⅕
12-h.p. De Dion ...	0	57⅖	18-h.p. James&Browne	0	49⅖
16-h.p. Maxim ...	1	21⅕	20-h.p. Thornycroft ...	0	38⅗
6-h.p. Crouan* ...	——		18-h.p. Siddeley ...	0	39⅗
8½-h.p. Humber ...	1	2⅖			

* After maximum time. Times not recorded.

GORDON-BENNETT ITEMS.

At the big banquet on June 18th, in the Homburg Kurhaus, the Presidents and Vice-Presidents of the leading automobile clubs of the world will be invited as guests, together with members of the clubs who have rendered conspicuous service to automobilism. The gathering is likely to be a very important one, and as the seating capacity is limited, automobilists who wish to be present should make their application, accompanied by 30*s.*, for a seat to be reserved. Application should be made to the German Automobile Club at the Kurhaus, Homburg, v.d.H., up to June 10th.

Although for some time it has been generally accepted that the Gordon-Bennett Race would be permitted to be run by the German authorities, no formal notice to that effect had really been issued, and until several of the German authorities, high in position, had thoroughly inspected the course last week-end, the formal official sanction was not actually issued. This, however, is now all in order, as a Commission of 17 officials and technical experts have thoroughly approved of the route and the arrangements made for the race, after having carefully inspected the road, starting from the Saalburg, 10 motor cars being employed for this purpose. A number of minor requisitions were naturally made which will in due course be attended to. The most minute inspection was made, and no loophole left for accidents to creep in, so far as danger to the public is concerned. The grand and other stands have been tested, and, at the suggestion of Herr Von Budde, the Prussian Minister of Public Works, a bridge will probably be built over the race course at a point near the Wehrheim Railway Station.

America will be unrepresented at the Taunus Course next month in competition for the Gordon-Bennett Cup. The extra tests which were arranged for by the A.C. of America on the Empire track proved a fiasco. The Winton "Bullet" did not start, and the Peerless car retired soon after it had made a start as, in the absence of Christie and his car, who did not turn up at all, the Peerless driver declined to continue running. Most sensible people, not only in Europe, but in the United States, we fancy, will be in accord with the decision of the A.C. of America to send no team over this year to represent them in the race.

To the Editor of THE AUTOMOTOR JOURNAL.

SIR,—I shall be greatly obliged if I may thank, through your paper, the number of very kind friends who have inquired regarding my recent accident. I am pleased to say that it proved to be of a very slight character, and I am now out and about again in excellent health.—Yours truly,

W. CLIFFORD-EARP.

Douglas, Isle of Man.
May 8th.

In reference to the selection of the British team for the Cup race, and the protest against the exclusion of Mr. Clifford Earp made by Mr. S. F. Edge, a copy of which we published last week, the A.C.G.B.I. have issued the following official communication:—

In a number of newspapers there appeared on May 13th particulars of a letter alleged to have been sent by Mr. S. F. Edge to Mr. Orde, protesting against the selection made by the Races Committee of the cars and drivers for the Gordon-Bennett Race.

As a fact this letter has never been received, but a letter dictated on the 15th, dated the 16th instant, was received on the night of the latter date from Mr. Edge, which has been dealt with by the Races Committee.

The protest and the Press paragraphs, which have been widely circulated, have been founded on the statement which was appended to the Races Committee's award, namely:—

> "But for the mishap to the car No. 6, driven by Mr. Clifford Earp, it would have taken second place in the team selected."

This statement was published with the award as a recognition of the previous performances of this car and its driver during the trials.

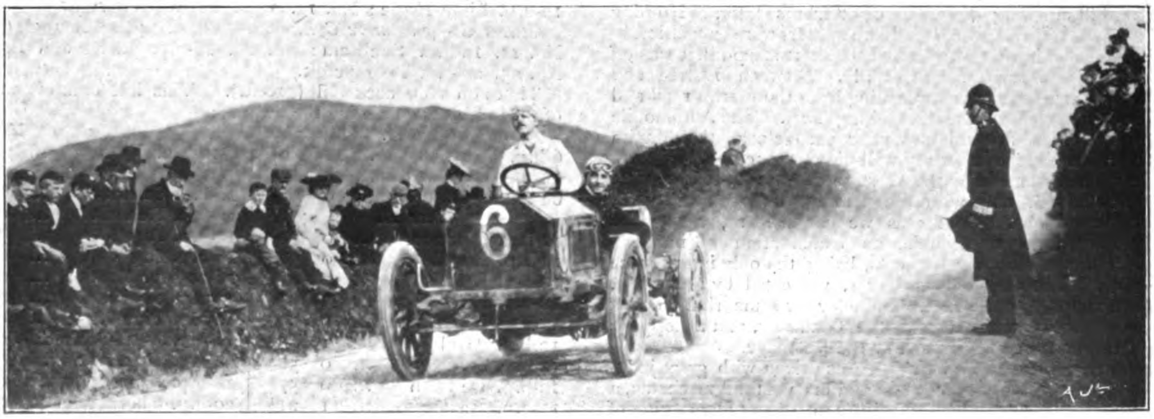
There was nothing in the statement to warrant the assumption which has been publicly made that there was any wide difference between the performances of car 6, driven by Mr. Earp, and car 12, driven by Mr. Jarrott.

After the conclusion of the trial on Thursday, the committee had to decide which of the cars and drivers then before them were best suited to represent the club in the race.

The committee throughout had regarded the driver and the car as a unit which could not be separated after the Selection Trials. They, therefore, formed their judgment on the results of the trials and the condition of the cars and drivers on the Thursday evening, and did not feel justified in entering into speculation as to what might be their condition at a subsequent date.

Mr. Charles Jarrott writes us under date May 24th as follows:—

"On my return from France from the French Eliminating Trials, I notice that it has been stated that I shall not drive for England in the Gordon-Bennett Race in Germany. As I have been nominated by the Automobile Club of Great Britain and Ireland to represent them in the race, I would like to definitely state that I shall drive in the race in Germany on behalf of England."



THE ISLE OF MAN TRIALS.—Mr. Clifford Earp descends the Hill at Ramsey for his second run. The characteristic attitude in driving, of Mr. Earp, is specially noticeable in our photograph.

1 2. 3.

THE GORDON-BENNETT CUP RACE.—Before finally giving official permission for the Race to take place on the Taunus Course, in Germany, the arrangements for accommodating the public on the stands and for protecting the course from invasion and the public from risk of accident, a specially-appointed Commission of officials and experts was appointed by the German authorities to thoroughly inspect and report upon the whole details of the arrangements. In our picture given above are seen some of the members of this Commission in front of the starting point, the "Restauration zur Saalburg." Seated in the car are three of the German Ministers, viz., (1) Von Budde, (2) Von Hammerstein, (3) Baron Von Brandenstein.

THE German Automobile Club has published regulations for the Kiel Regatta, the motor boat competition for which will be held on Saturday, June 25th, at 10 a.m. For this event all craft are eligible that are propelled exclusively by mechanical means, sailing being barred. A certain rule of rating is to be adopted. It will be decided by a formula—

$$R = \sqrt[3]{\frac{L \times N}{B \times T}}$$

in which L = the length along the water-line in metres, B = the midship beam, T = the midship draught, and N = the value of the b.h.p. of the motors. There will be three categories for the competing boats: (1) boats up to 8 metres in length; (2) boats from 8 to 12 metres in length; and (3) boats of upwards of 12 metres in length. The course for the first of these is 17 kiloms., 36 kiloms. for the second, and 60 kiloms. for the third. All boats entered must be the property of the person in whose name they are entered. The starting point is at Laboe, and the boats are to have a flying start of 300 metres. The prizes for the competition are trophies only. No limits are imposed as to the crews carried, but each boat must have on board at least one passenger who is a member of the German Automobile Club, of a club which is affiliated with it, of the Imperial Yacht Club, or of the North German Regatta Club. The entry for each boat is 40 marks. Entries close on June 1st at 10 p.m.

THE GORDON-BENNETT CUP RACE.—Baron Von Brandenstein carefully examining plans in connection with the Taunus Course, during his inspection with the other Commissioners last week end.

This event should prove of exceptional interest to English motor boat builders, as the event will, in all probability, be witnessed by King Edward, who will be present at the regatta.

Non-Stop Runs.—In reference to applications to the A.C.G.B.I. to vouch for special non-stop runs, it has been decided by the Races Committee that firms applying in the future for an officially recognised run shall only be allowed to have the run over a distance of 250, 500, or 1,000 miles, or between fixed points not less than 250 miles apart. No vehicle during these runs will be allowed to go over the same route more than twice. An endeavour will be made to bring in a rule debarring powerful cars capable of high speeds from taking part in any of the club competitions. In any case such entries will not be accepted until they have been considered by the committee.

1904 Small Car Trials.—This Endurance Test, which is now being actively taken in hand by the A.C.G.B.I., and which will be held in September next, will not be open to quadricycles and similar machines. In all probability the definition for this type of vehicle will be a vehicle weighing less than 5 cwt., having no reverse, and not having two seats side by side. The classification will be :—

Class 1.—Not exceeding £125;
Class 2.—Exceeding £125 and not exceeding £150;
Class 3.—Exceeding £150 and not exceeding £175;
Class 4.—Exceeding £175 and not exceeding £200.

Entries will only be accepted from manufacturers or their nominees, and not more than two cars will be allowed to be entered directly or indirectly by any single manufacturer which, unless there is more than 20 per cent. difference in cylinder capacity, shall then be run as a team. The fundamental principles of the trials are that the cars shall make non-stop runs consisting of six runs of 100 miles each, or 12 runs of 50 miles each, spread over a period of six days. These runs to be performed at a minimum average speed of 12 m.p.h. for all except Class 1, in which the average speed may probably be reduced to 10 m.p.h. An attempt may possibly be made to award marks for simplicity.

In the Milan Reliability Trial, which was held from May 11th to the 15th, for touring cars, the following results were secured :—

CLASS I.—*2-seated cars carrying a weight of* 150 *kilogs.*:—(1) 5-h.p. Oldsmobile (Dr. Soldati), 130 points; (2) 9-h.p. Fraschini, 127 points.

CLASS II.—*4-seated cars carrying* 300 *kilogs.*:—(1) 16-h.p. Martini, 171 points; (2) 16-h.p. Fiat.

Besides fuel consumption, which was a strong feature in the competition, turning, brake-power, hill climbing, &c., were taken into consideration. The smallest consumption was that of the Oldsmobile, which used 46 kilogs. of petrol for the 812 kiloms. which the cars had to traverse.

On Monday next the Belgian Circuit National commences, when the run will be from Brussels to Antwerp, the next day from Antwerp to Spa *viâ* Liege, June 1 to Arlon, including a hill climb in the morning at Malchamps, June 2 to Namur, with speed kilometre races in the afternoon, and on the last day (June 3) back to Brussels.

Sixteen entries have been received for the Carburettor Competition of the A.C. de France, which commenced on Tuesday last.

The Coupe Rochet Schneider will be competed for on June 4th next. This is for tourist vehicles only, and organised by the A.C. of Rhone. The cars will start from and finish at Lyon, the route passing over some severe stretches of road, including the Faucille Pass and Laffrey Hill. Regularity of running and small consumption of fuel are the guiding factors in the competition.

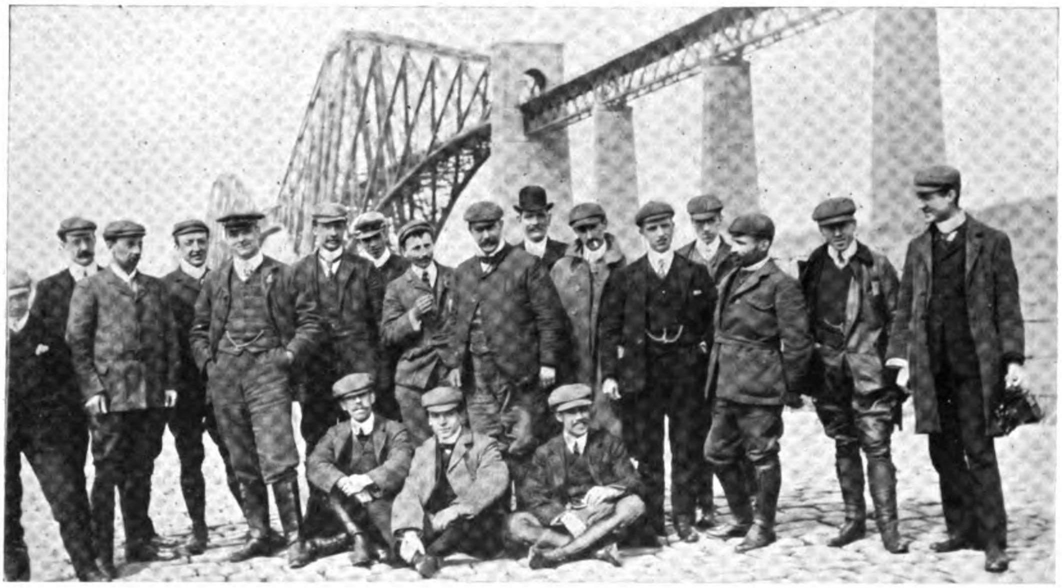
At the Arras meeting, which commenced on Tuesday last with weighing formalities, &c., it is hoped to see some record times secured in the speed mile and kilometre events which are taking place during the week, as it is hoped that several of the crack cars, fresh from the French Ardennes Eliminating Trials, will take part in the races, Arras only being 154 kilometres from Rethel.

Auto Cycle Club's Hill Climbing Competition.—The official results for this event, the particulars of which we gave last week are as follows :—

Competitor.	Machine.	Cylinder Dimensions.	Weight.		Time.	Place.
			Machine.	Rider.		
		m.m.	lb.	lb.	m. s.	
		CLASS 1.				
A. A. Chase ...	Chase ...	65 × 76	125	140	1 $2\frac{1}{5}$	1st
A. F. Ilsley ...	Phoenix...	69 × 70	121	170	1 $25\frac{3}{5}$	2nd
E. Perman ...	Torpedo	60 × 70	94	151	1 43	3rd
		CLASS 2.				
F. R. Goodwin ...	Griffon ...	75 × 77	139	162	0 $48\frac{1}{5}$	1st
C. W. Brown. ...	F.N. ...	70 × 80	167	168	1 $19\frac{4}{5}$	2nd
		CLASS 3.				
A. A. Chase ...	Chase .	75 × 85	140	140	0 $44\frac{2}{5}$	1st
J. F. Crundall ...	Humber	80 × 80	161	139	0 $47\frac{3}{5}$	2nd
Rev. B. H. Davies	Ormonde	80 × 80	142	160	0 $49\frac{1}{5}$	3rd
A. C. Wright ...	Roe ...	80 × 80	143	148	0 $53\frac{3}{5}$	4th
D. E. Brown ...	Ormonde	80 × 80	165	132	0 $56\frac{4}{5}$	5th
Wilbur Gunn ...	Lagonda	78 × 82	161	151	0 $56\frac{4}{5}$	
		CLASS 4.				
F. W. Chase ...	Chase ...	90 × 90	276	263	1 $6\frac{4}{5}$	1st
Wilbur Gunn ...	Lagonda	86 × 96	323	285	1 15	2nd
J. Van Hooydonk	Phœnix...	82 × 82	340	322	1 $20\frac{2}{5}$	3rd

Auto Cycle Club.—All riders intending to take part in the combined run to Great Yarmouth to-day, Saturday, are requested to meet at the Old Salisbury Arms, High Barnet, at 10 a.m., and the start will be made at 10.30 a.m. sharp. The following is the route to be followed :—High Barnet, Hatfield, 9 miles; Hertford, 7; Ware, $2\frac{1}{4}$; Puckeridge. $6\frac{1}{4}$; Barkway, 8; Barley, 2; Tun Bulls House, 3; Newmarket, 18 (lunch Victoria Hotel, 1 p.m.); Bury St. Edmunds, $14\frac{1}{4}$; Harleston, 29; Bungay, $7\frac{1}{4}$ (tea, King's Head, 5 p.m.); Beccles, $6\frac{1}{4}$; Yarmouth, 14 (Queen's Hotel, 7 p.m.).—Total, $126\frac{1}{2}$ miles. The return journey on Sunday will be *viâ* Ipswich, Colchester, Chelmsford, Dunmow, Bishop's Stortford, Ware. The headquarters of the club at Great Yarmouth will be the Queen's Hotel. Arrangements have also been made with Mr. F. Flanders, 11, Regent Road, Great Yarmouth, to supply petrol, sundries, &c. Accumulators can be charged Saturday night for Sunday morning.

On Wednesday last, May 18th, Mr. E. J. Steel covered the 400 miles from Edinburgh to London *viâ* York on a Quadrant motor bicycle in 20 hours 47 mins. without any attempt at forcing the pace, and without endeavouring to make a non-stop run. No hindrances were encountered, and the trip was an even, uneventful journey. Steel hopes to hurry later on and treats this performance (albeit a record one over the course) as a casual jaunt, a mere walk over. He actually got off and fed humanly, a most unwarrantable proceeding for a speed man!



LONDON-EDINBURGH MOTOR CYCLING CLUB RUN.—The "Survivors" of the 24-hours' ride to Edinburgh visited the Forth Bridge on Sunday morning. Our photograph shows the group taken at the Queen's Ferry Quay of the Forth Bridge.

LONDON TO EDINBURGH BY MOTOR CYCLE.

UNDER the auspices of the Motor Cycling Club, a test of reliability was arranged for Whitsuntide in the form of a run for genuine touring machines, travelling at ordinary touring pace between London and Edinburgh, minimum and maximum times being enforced for the machines to arrive at their destination. Twenty-four hours was the maximum time allowed for riders in which to secure the Club's gold medal, and the minimum time for covering the distance specified was 22 hours. All competitors arriving within these limits were entitled to receive the medal. Those reaching Edinburgh within 30 hours receive certificates. Riders arriving in less time than 22 hours were liable to disqualification. Out of an entry of 70, 46 had started on Friday evening by about 10 o'clock from the General Post Office. Prior to the sending-off the competitors had assembled in Paternoster Square under the marshalling of Mr. J. A. Jackson. At about 9.50, when the necessary preliminaries had been completed, Mr. C. W. Brown, the Hon. Secretary of the Trials, headed the competitors for the General Post Office, where the interest taken by the public had brought together a goodly crowd to witness the proceedings, at times causing considerable inconvenience to the officials in getting the machines away. By five minutes past 10 the whole of the riders had been sent on their way without any mishap, each competitor's start being greeted with varying degrees of cheering, according to his popularity. The chief points on the route were Biggleswade (45 miles), Grantham (110¼), Tuxford (137¾), Wetherby (193½), Durham (259½), Alnwick (308), Berwick-on-Tweed (338), Dunbar (368), and Levanhall, Musselburgh (390). Time for meals was allowed at Grantham, Wetherby, Durham, and Berwick. It could hardly be expected that, with so large a number of machines, they would all get through without mishap, and the fact that 22 secured gold medals by arriving within the specified time must be considered a fair proportion of the starters. Nine riders arrived practically in a bunch at the Scottish capital by 8 o'clock. The other 13 successful competitors came in at intervals after this up to 10 o'clock.

The 22 competitors who secured their medals were:—F. H. Arnott (3-h.p. Werner), C. E. Bell (3-h.p. Quadrant), C. W. Brown (2¾-h.p. F. N.), D. E. Brown (3-h.p. Ormonde), A. Candler (3-h.p. Quadrant), H. E. Cowles (2¾-h.p. Minerva), J. F. Crundell (2¾-h.p. Humber), H. J. Densham (2¾-h.p. Anglian), C. Fox (2¾-h.p. Vindec), C. W. Hacking (3-h.p. Ormonde), J. van Hooydonk (3½-h.p. Phœnix Trimo), T. van Hooydonk (3½-h.p. Ariel); F. Hulbert (2¾-h.p. Hulbert-Bramley), H. P. Maffert (2¾-h.p. Bat), W. J. Milligan (2¾-h.p. Bradbury), J. H. Reeves (R. and P.), W. A. Sale (2-h.p. Quadrant), T. Silver (4½-h.p. Quadrant Tricar), W. H. Wells (2¾-h.p. Vindec), H. Williamson (3¼-h.p. Rex), A. Wright (3-h.p. Roe), L. H. Young (2¾-h.p. Werner).

Prior to the start Mr. S. F. Edge, at a send-off supper, made some encouraging remarks to the competitors in which he pointed out the by no means easy task before the participants in the test which, he reminded them, was essentially one of the reliability touring machine and not a speed contest in any shape or form.

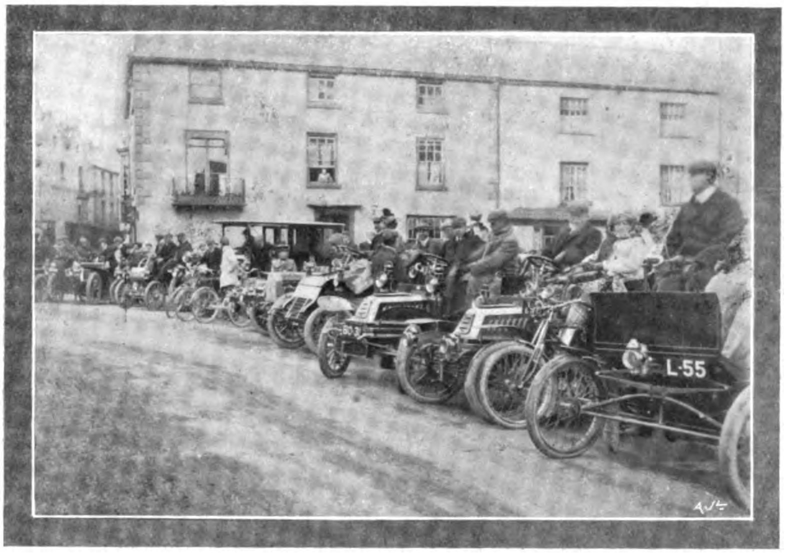
THE Motor Boat Races on Lake Lucerne, in Switzerland, it has now been decided definitely, are to take place on September 10–12 next. The meeting will commence with races for cruisers, divided into classes for 8-metre boats (30-h.p.) and 12-metre boats (50-h.p.). The second day will be reserved for the racers up to 12 metres length, which will compete for the Coupe du Lac de Lucerne. The speediest boat round the course will be the winner. Valuable money prizes will also be attached to this event. The distance of the course, starting from Lucerne, will be 114 kiloms., marked out by means of fourteen buoys.

A REMARKABLE series of cinematograph photographs of the Eliminating Trials in the Isle of Man for the Gordon-Bennett Race are now being exhibited at the Palace Theatre every evening. These first appeared on Thursday of last week, within 48 hours of the events taking place in the Isle of Man, and comprise a series of views commencing with the start at Quarter Bridge, Douglas, followed with the cars going at full speed down Snaefell, and concluding with a number of incidents at the Ramsey Control.

IN connection with the ninth Liverpool Motor and Cycle Show taking place from March 3rd to 11th, the plan has now been issued, and the directors announce that by having secured the North Haymarket, they will be able to allot space to all applicants. The large yard will be used for the trials of motors, for which medals will be awarded, and Sir Alfred L. Jones's Challenge Cups, for one hundred guineas for commercial vehicles, and twenty guineas for pleasure cars, will be open for competition. In addition, there will be skilled driving competitions.

MOTOR cars are to be admitted to a special enclosure at the Annual Royal Horse Show, held in the Old Deer Park, Richmond, this year on June 10th and 11th. The charge will be 10*s.* for each car and 1*s.* per occupant.

CLUB DOINGS.



Meet of the Gloucestershire A. C. and the South Wales and Monmouthshire A. C., at Monmouth, on May 14th.

Gloucestershire Automobile Club.—A very successful joint run and meet with the South Wales and Monmouthshire A.C. was carried through the week before last between these clubs, when the Beaufort Arms Hotel at Monmouth was the point selected for the day. Mr. A. H. Wyatt, the president of the Gloucestershire Club, presided at the gathering, and the run both out and home was a delightful experience, despite the dust and a rather objectionable plague of flies which appears to be spreading all over Great Britain at present. Last Saturday the club joined with the Herefordshire A.C. at the British Camp Hotel, Malvern. To-day, May 28th, they meet the Reading A.C. at Farringdon, and the fixtures so far arranged for the rest of the season are:—June 5th, Malmesbury; 12th, Cirencester; 18th, a combined meet of the club with the South Wales and Monmouth A.C. and the Herefordshire A.C. at Tintern; 25th, meet with the Oxfordshire A.C. at Burford; July 3rd, run to Eastn or Castle; 10th, to Elmley Castle; 17th, to Frampton-on-Severn; 23rd, inter-club meet with Wolverhampton and district A.C. at Worcester.

The vitality displayed by this club under the indefatigable working of the hon. secretary, Mr. H. Dyer, is leading to a rapidly increasing membership.

Blackheath Automobile Club.—This recently-formed club has already thirty members, and has as its president Lord Hugh Cecil, M.P., and as vice-presidents Sir John MacDougald, L.C.C., and Professor Carlton J. Lambert, M.A. Mr. Arthur Roberts, Madgelands, Beaconsfield Road, Blackheath, is the hon. secretary.

Dorset Automobile Club.—A new club under this title has been formed for the county, with headquarters at Dorchester. The Right Hon. Lord Alington has consented to become as president, and the hon. secretary and treasurer is the Rev. Ernest D. Benison, Farrs, Wimborne. The committee is constituted as follows:—Major the Hon. Wilfrid Cairns, Rev. H. C. Coote, Mr. W. B. Cosens, M.D., Captain St. John Coventry, Mr. H. F. W. Farquharson, Mr. R. F. Glyn, and the Rev. P. H. Milne.

The club starts with a membership of twenty-five.

Ladies' Automobile Club.—The Duchess of Sutherland, it is announced, has consented to be President of this Club. The following candidates were elected to membership last week:—Lady Burrell, Mrs. Stracey Clitherow, Miss F. H. de R. Hardman, Lady Herbert, Viscountess Ingestre.

Southern Motor Club.—The route of the 100 Miles Reliability Trial organised recently by this club for motor cycles was from Purley to Wych Cross, *viâ* Caterham, Godstone, and East Grinstead, this road being covered twice. Twelve competitors started, the weather being delightful throughout. The results were:—1st prize, a Silver Cup, H. C. Bygrave (2¾-h.p. Crypto); 2nd prize, C. Pattison (3½-h.p. Phœnix). Non-stop runs were also accomplished by May (3½-h.p. Minerva), and Lorkin (2¾-h.p. Excelsior). One stop was made by Kingdom (4½-h.p. Linnon), the other competitors giving up after 25 to 30 miles had been covered. These were:—Messrs. East (2½-h.p. Minerva), Wall (3-h.p. London), Jones (4-h.p. Excelsior Tricycle), Billing (2¾-h.p. Excelsior), B. Pattison (3½-h.p. Phœnix), Aikman (2-h.p. Minerva), Cufley, 3½-h.p. (Austin Tricycle). Mr. F. C. Pattison was judge, and Mr. Alan Vickers, N.C.U., official timekeeper.

Wolverhampton Automobile Club.—The new club premises in London Buildings, Lichfield Street, which were opened about a fortnight ago, are now getting into good working order. Upon the formal opening of the premises Mr. J. O. Evans, the President, was glad to hbe able to announce that the membership, which was now 100, and still growing, thoroughly justified them in the steps which they had taken to secure premises of their own. The cost of furnishing, about £300, had been amply provided for, and a substantial guarantee formed against any possible loss in the carrying on of the club. The result was a very hopeful prospect of the venture proving an unqualified success. About 40 members responded to the invitation of the President to be present at the inaugural ceremony, Mr. Norman, M.P., one of the Vice-Presidents of the club, who was unfortunately prevented from being present, sending a telegram of congratulation upon the result of the efforts of the committee.

Last Saturday about 30 members of the club journeyed to Bridgnorth, from which point the run was continued to Shifnal, and back home.

THE dust has come in early this year, and as a result complaints are already beginning to find their way into the Press *re* the motor car-*cum*-dust nuisance. It will be observed, as we have already frequently pointed out, that we have not heard any outcry to speak of during all the practically dustless months of the immediate past. It is the dust almost entirely that explains the outbreaks of popular hostility against the automobile when they occur. The campaign appears to have commenced in Richmond Park, and takes the usual silly form of a demand for the reduction of the speed of cars, Alderman Burt having proposed that in the opinion of the Richmond Corporation the speed limit in the Park should be 10 miles an hour. Now it is not alleged that the cars occasion any danger. It is desired to reduce their speed merely to diminish the dust. Well, on a dusty road the faster a car goes the more dust is, of course, thrown up, but plenty is thrown up at even 10 miles an hour when dust is present in sufficient quantity. The whole thing is putting the cart before the horse. If the roads through Richmond Park are dusty, it would better become the Corporation to allay the dust than to reduce the speed of traffic. They might try some of the recently introduced preparations for that purpose, or even if they are not sufficiently progressive to feel much confidence in them, they might try watering, otherwise the dustier roads get the slower the Richmond Corporation will demand that cars should proceed.

Mr. Julian W. Orde, the Club Secretary, has been nominated as the representative of the A.C.G.B.I. on the International Commission for the race in the Taunus.

THE Lord Mayor of Liverpool, it is proposed, should have an electric brougham for use in connection with his municipal duties, instead of the present horsed carriage.

THE Kent County Council has refused the Hythe Town Council's request for an application to the Local Government Board for a regulation limiting the speed o motor cars in the borough to ten miles an hour.

A REPRINT, in pamphlet form, has just been issued of a lecture on the Development of Motor Traffic and its Connection with Commerce, read before the London Chamber of Commerce, by the Hon. C. S. Rolls, on February 9th last. At the time we gave a full summary of this interesting lecture, in which some valuable figures of the relative average working cost of motor wagons as against horse-drawn wagons, were given.

KINGSTON-ON-THAMES is just now a place to be avoided owing to the "attention" of the local police. Two traps are being worked on the Kingston side of the Reservoirs on the Portsmouth Road, one from Cleveland Road to Uxbridge Road, and another one from Palace Road to St. Leonard's Road, and *vice versa* in each case. The method is to charge every motorist with driving to the danger of the public. Result, with the help of the Kingston Bench, conviction every time.

ONE of the usual dog cases which came before His Honour Judge Emden in the Lambeth County Court was decided, on the 19th instant, in favour of the defendant automobilist, Mr. Dawson. Mr. Dawson had unwittingly driven over a dog, and had offered to compensate the owner for his loss. Nevertheless, the owner of the dog thought fit to bring a County Court action, which, after Mr. Dawson's generous initiative, it will probable be satisfactory to most people to learn that the dog owner lost.

THE ISLE OF MAN TRIALS.—The Napier "team" of five waiting their call at Ramsey for the Hill Speed Test.

A SPECIAL general meeting of the members of the Motor Union will be held on July 18th, for the purpose of considering, and if thought fit, adopting the new rules which have been drawn up by the special committee appointed for that work.

ONE hundred and twenty firms have already, we are advised, booked their space for Messrs. Cordingley and Co.'s Automobile Exhibition at the Agricultural Hall next year. As this number is in advance of the bookings of the corresponding period of any previous year, the automobile season for 1905 promises to be extremely healthy.

ON Whit-Monday His Majesty the King, attended by Lord Farquhar and Captain Holford, drove to Hurst Park in his motor car for the races. The Prince and Princess of Wales travelled by the same means from Windsor Castle to Aldershot, with the Earl and Countess of March, Sir Arthur Bigge and Lady Catherine Coke, on a visit to Lieut.-General Sir John French and Lady French.

MR. DAN ALBONE, whom we know in connection with the Ivel agricultural motor, has brought out another invention which ought to facilitate very greatly the operations of the Red Cross Society on the battlefield, and, in fact, might be of the greatest use to those bravest of the brave, the ambulance men, who, non-combatants themselves, creep up into the most dangerous places of the battlefield to carry off the wounded from under fire. Mr. Albone's invention may be described as an armour-plated ambulance car fitted with an Albone motor which enables it to be driven over the roughest ground at six miles an hour. It enables the wounded to be accommodated inside it, and shielded at any rate from rifle fire. When advancing, its doors open so as to form a wide shield, behind which the ambulance men can walk and be very considerably screened from the fire to which they would be otherwise exposed. The armour-plating of the machine was tested recently at Bisley, and subjected to a hail of bullets, which failed to injure it beyond producing the slight damage of breaking two nuts.

Two civil motor car suits which have been recently decided in Scotland afford an agreeable contrast to the preposterous case on which we comment editorially elsewhere. In one of these an automobilist had the misfortune to run over and occasion the decease of a bull terrier which the owner somewhat exorbitantly valued at the sum of £10, a portion of which amount he probably regarded as a solatium for his lacerated feelings. It was clear, however, that the driver was not in any way to blame, and the judge, in this case a sheriff's substitute, summed up the situation by pointedly inquiring, "Does the law saddle the driver of a motor car with the responsibility of avoiding dogs running at large on the public highway?" and answered his question by the ruling that "a person who takes a dog unled upon a public road accepts the risks of the traffic and relies upon his dog being able to look after himself." It would be a blessing if a similar judgment were to be pronounced in this country, as the results might induce dog owners to curb one of the leading propensities of their favourites to take a dive from the footpath under the wheels of any advancing motor car or cycle with the apparent object of emulating the small boy in his own peculiar pastime of "last across."

Mr. J. Hamilton Benn is a particularly enthusiastic yachtsman, and is the owner of the "Hesper." The above photograph shows this 17 ft. motor boat which Mr. Benn has just had completed for him to the designs of Mr. F. Shepherd. It is fitted with one of the 3-cylinder 14-h.p. Brooke marine engines and the tests on a measured mile, although the craft is only 17 feet long, showed a speed of 9½ miles per hour. We shall hope to see this little craft test its powers frequently during the season against other motor boats of its own class. At the regatta on Oulton Broad, last Monday, she won the handicap for motor boats of under 30 ft. in length, which was held under the rules of the Marine Motor Association—coming in an easy first with a lead of over 15 mins. on the second boat.

IN the other case a public-spirited manufacturer has a tram line running at right angles across a road, the line on either side being apparently concealed by hedges. The driver of a motor car was approaching this spot recently when a trolley drawn by two horses, without any driver apparent, popped across the road from behind the hedge. He pulled up as rapidly as he could, and his front wheels actually came to a stand between the tram lines. One of the lamps, however, grazed a horse, who broke his traces and disappeared into the surrounding country. For injury done to the horse the owner sued the driver of the car for damages, although it was not proved that the horse was really injured. The amazing point about the case, however, was, that the witnesses for the prosecutor, or, as he is called in Scotch law, the pursuer, variously estimated the speed of the automobile at from 3½ to 50 miles an hour. This was too much for the Sheriff substitute, who refused to believe any of them, but at the same time pointed out that even if he had done so he would have found the pursuer guilty of contributory negligence, inasmuch as his tram line at right angles to the road was nothing more or less than a trap for legitimate users of the road.

FROM time to time statements have appeared chiding the Post Office authorities with want of enterprise in not substituting motor-driven vehicles entirely for their system of horse-drawn postal service at present in use. We have always maintained that the Post Office have shown, as far as it is possible, the greatest desire to keep well to the front in regard to adopting mechanical traction as speedily as possible considering the very important requirements of this Government department. In fact, experience has shown that they are prepared to test any system which gives a reasonable prospect of success, but during the past few years it can hardly be contended hat the results have been so satisfactory that the Postmaster-General should contemplate any very great extension of the system, having in mind his obligations to the public in the event of any breakdown. Most of the experiments, however, have marked a step forward, and have brought out some weakness which it has been possible to remedy from the experience gained. In dealing with the May Day Motor Parade recently we gave a few particulars of the very successful manner in which one of the latest services have been conducted on behalf of the Post Office, viz., the regular service which has been running for some time between the head office and Epping, in which Milnes-Daimler vehicles have been employed. We are glad now to notice that this statement has been fully confirmed by the Postmaster-General, Lord Stanley. On the occasion of the House of Commons going into Committee of Supply last week the vote for the Post Office Service was considered, and Lord Stanley then officially stated that the motor car services employed by the Post Office had not been particularly successful, with the exception of the service running between London and Epping, which was doing most excellent work. As we have already announced, this service is to be further extended.

THE ISLE OF MAN TRIALS.—Mrs. Mark Mayhew is keenly interested in the evolutions of her husband, Lt.-Col. Mark Mayhew on his Napier.

SCARCELY a week passes without witnessing the introduction by one of our railway companies of a motor car or motor 'bus service designed to feed and act as an extension of their more outlying stations. The Great North of Scotland Railway has been the most recent company to adopt this progressive policy, and is adopting it on a satisfactory scale. A motor 'bus service has been inaugurated between Ballater and Braemar, by means of four motor 'buses supplied to the company by Milnes-Daimler, Limited, of Tottenham Court Road, London. The 'buses are designed to accommodate 16 persons inside and two in front, with the driver, while ample room is provided on the roof for carrying luggage, and a compartment constructed for the transport of special merchandise. The engines with which the vehicles are fitted are of the 4-cylinder Milnes-Daimler type, and develop 16 h.p. at 1,000 revs. per min. The total length of the 'bus body is 11 ft. 5 ins. being 5 ft. 5½ ins. wide on the roof. A projecting canopy in front shelters the driver, and a similar canopy at the rear protects the conductor. The sides of the bus are fitted with glass windows, which can be removed in summer, and acetylene gas lighting is employed throughout. The first of the vehicles arrived at Ballater last week, and was put to a very severe test on the Craigendarroch Brae. It was loaded up with 20 people inside, and took the steep incline of this hill at a speed of 5 miles per hour, and in every way gave perfect satisfaction. On Saturday in last week a number of directors and leading officials of the railway company had a run on the 'bus from Ballater to Braemar and back, and were thoroughly satisfied with its performance. The service is at present to consist of two 'buses daily in either direction from Ballater to Braemar and back again, each bus being timed to arrive at Braemar in time for one of the principal southward trains of the day.

THE enterprise of the Great North of Scotland Railway is one more instance of the fact that the railway companies are coming to recognise in the automobile, not the dangerous competitor and enemy which it was at one time feared they would look upon it as being, but a potential ally and assistant of the highest possible value. One is reminded of the old days when railways were introduced, and when the horse-breeding interests with one accord proclaimed that the railway would lead to the extinction of the horse. At the present moment the railway companies are by far the largest employers of horse traction in the United Kingdom.

AMONG the most satisfactory signs of the times is this regularly increasing introduction by corporations and railway companies of heavy types of automobile for public service automobiles, instances of which we give above. It is necessarily the solid tyre which is used for many of these classes of conveyance, and it is satisfactory to learn that improvements in the manufacture of solid tyres are enabling the high degree of excellence that has been reached in these vehicles to produce their full commercial effect. Early experience with solid tyres was often unsatisfactory, with the result that manufacturers found themselves compelled to enter into maintenance contracts to secure orders. The Shrewsbury and Challiner Tyre Company now inform us that their solid tyres—the "Giant" and the "Twin"—have for a long time past given such satisfaction that many of their customers who are employing these tyres for heavy vehicles now prefer to purchase the tyres outright rather than to enter into any maintenance contracts. No better proof than this of the reliability and perfection to which the solid tyre has been brought need be asked for, and the important demand which exists for solid tyres is well illustrated by

THE ISLE OF MAN TRIALS.—Mr. Campbell Muir at the wheel of his Wolseley car, which he drove so well, but with which he experienced bad luck.

the fact that the company have forty complete sets of solid tyres in hand at the present moment.

Mr. Loxton Hunter writes us that it may be of interest to British manufacturers to learn that tenders are invited for the supply to the Committee of Port Works at Almeria, Andalusia, Spain, of a launch with motor, at a cost not to exceed 29,000 pesetas (about £750). Tenders must be sent in within 60 days of the 7th of May. A complete translation of the notice for tenders may be seen on application at the Commercial Intelligence Branch, Board of Trade, 73, Basinghall Street, E.C.

The "Park-pest" agitation, which has been carried on for some time past in the daily Press, for the exclusion of unsavoury and otherwise unpleasant tramps from the London parks, has resulted in new rules for park management being drawn up and laid before Parliament by Lord Windsor, the First Commissioner of Works. In the same set of rules Lord Windsor has incorporated a provision dealing with the regulation of motor vehicles. Presumably on the ground that they also are a species of "pest," mechanically propelled carriages are discriminated from other traffic, and "*only* admitted subject to such regulations as *may from time to time be framed* by the Commissioners of His Majesty's Works and Public Buildings."

Mr. C. Pinoli, of Wardour Street, informs us that he has encountered a particularly unattractive brand of Sabbatarianism in the town of Reading. On a recent Sunday Mr. Pinoli travelled down in his car, and when in Reading he made the discovery that he had unexpectedly run short of petrol, so he sent his mechanician round to a number of depôts where Pratt's motor car spirit was advertised for sale. All the traders at these various places were, however, absent from home, and after running the car a little further it came to a dead stop opposite the premises of Mr. Girdler, in the Vastem Road, who makes a business of selling petrol—on any day but Sunday. He absolutely refused to supply Mr. Pinoli with a thimbleful, either for money, promise of payment, or hopes of reward in this world or the world to come, and no powers of persuasion that Mr. Pinoli could muster would induce him to depart from this rigidly Sabbatarian attitude. We trust that all motorists running through Reading will duly honour Mr. Girdler's Sabbatarian scruples by refraining from purchasing petrol from him on Sunday. Whether they will, under the circumstances, be anxious to patronise his establishment on those days of the week when he condescends to do business is a matter we leave to them.

Progress is being made by the Special Commission appointed in Paris in regard to the issuing of a special tariff for public service automobiles. From the evidence already obtained it is proposed to put forward a charge of 1·75 francs for the first kilometre, and 50 centimes for each kilometre afterwards.

We learn that recent alterations in the business affairs of the City and Suburban Electric Vehicle Company have led to the severance by Mr. R. M. Campbell, M.I.M.E., A.M.I.C.E., of his connection with them. Mr. Campbell, who has had a very wide and varied experience in the manufacture and design both of petrol and of electric vehicles, has held the important post of chief engineer to the Company for the past three years.

Messrs. Carless, Capel and Leonard advise us that they have reduced the price of their standard petrol 1*d.* per gallon.

Any motor car owner who is taking his vehicle to the Continent to witness the Gordon-Bennett Race can arrange with the Stern Sonneborn Oil Company, of 57, Gracechurch Street, E.C., for a supply of any of their special lubricants, &c., to be delivered, carriage paid, without extra charge to any address they may desire in Germany, France or Belgium, during the period covering the motor events. In addition to the special lubricants for racing cars, this firm also supply lubricants, each specially suited to its functions, for ordinary cars air-cooled and water-cooled cylinders, valve gear, steam cars, axles and gear cases, &c.

Messrs. Van Raden and Co. (Limited) have written to inform us that they are the sole licensees and manufacturers of the manograph, to which reference was made in a recent issue, in connection with Professor H. L. Callendar's very interesting Paper on "The Indicator Diagram of a High-Speed Petrol Motor," which was read before the Auto Cycle Club, at the Royal College of Science on May 4th.

LAW REPORTS.

The First Automobilist Victory in the Divisional Court.—All the appeals to the Divisional Court which have been made on behalf of automobilists have been hitherto so uniformly unsuccessful that it is a pleasure to be able to record the fact that on Tuesday in last week a Divisional Court, consisting of the Lord Chief Justice and Messrs. Justices Wills and Kennedy, granted a *certiorari* to quash the conviction of Mr. R. S. Clifford by the Loughborough magistrates. Both the summons on which the defendant was brought before the magistrates and the conviction were bad in law, as the former included several different offences in one charge, and the conviction included them all in one conviction. The Lord Chief Justice said that it was impossible to contend that there was only one offence mentioned, and that the magistrates ought to have considered whether the defendant was driving in a manner dangerous to the public, apart from the question of the speed at which he was going. With this ruling the other two justices concurred. Mr. Avory, K.C., and Mr. Moresby White (instructed by Mr. Staplee Firth) appeared for Mr. Clifford, and Mr. C. B. Marriott for the Justices.

Manufacturers' and Traders' Records of Cars.—For not keeping a record of the distinguishing number and the name and address of a driver of a motor car which was being used for trial purposes, J. de Solla, manager to Evart Hall, Limited, was on Tuesday last, at Bow Street Police Court, fined by Mr. Marsham 40*s.* and costs. Defendant said there was nothing in the Act—the Motor Car Act of 1903—to show when the record was to be made. In this case the car had only been out for thirty-three minutes, and during that time he (defendant) was engaged with a customer. Mr. Marsham said he had no doubt the record should be made immediately the car went out, or even before. On the defendant remarking that the matter was one affecting the whole of the trade, the magistrate said he would inflict a sufficient penalty to make it clear what the duty of the trade was.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published May 19th, 1904.

11,294. C. E. R. Keddie Tyres.
11,028. C. Binks. Motor cycles.
13,044. Vickers, Sons and Maxim (Limited). Internal combustion engines.
13,501. W. J Crossley and J. Atkinson. Internal combustion motors.
22,367. L. Verdet and A. Metais. Explosion engines.
25,787. C. Monin. Variable speed transmission gear.

Applied for in 1904.

Published May 19th, 1904.

3,336. — De Visoly. Flying machines or apparatus.
3 750. J. W Bigsby and F. W. Barhoff. Explosive engine cylinders.
5,365. W. Lintern. Mud guard and road sanding attachment.
7,352. H. R. Palmer. Hydro-carbon engine.

THE AUTOMOTOR JOURNAL

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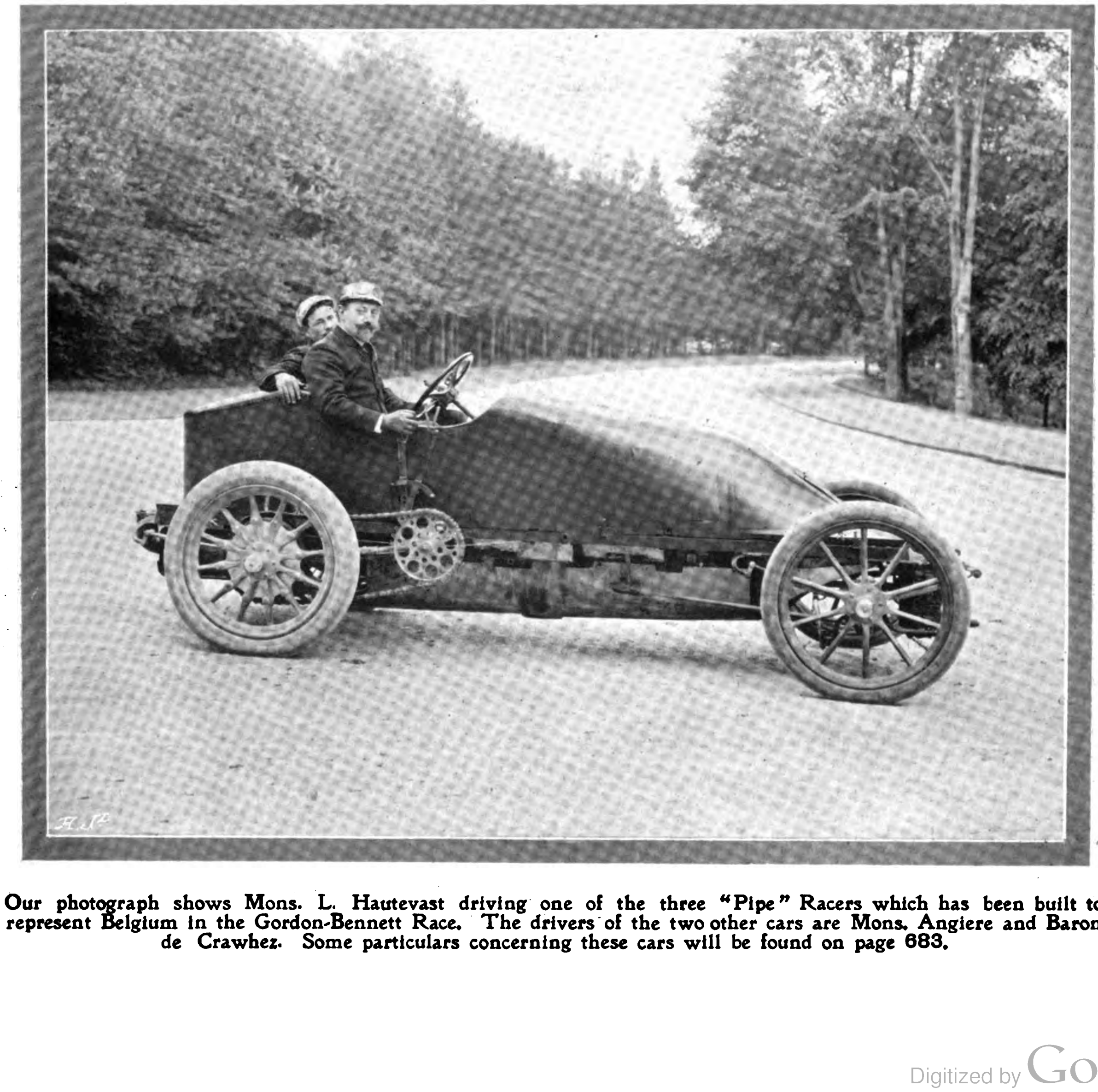

☞ Our photograph shows Mons. L. Hautevast driving one of the three "Pipe" Racers which has been built to represent Belgium in the Gordon-Bennett Race. The drivers of the two other cars are Mons. Angiere and Baron de Crawhez. Some particulars concerning these cars will be found on page 683.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
June 4 and 11	200 Miles Trial (Motor Cycling Club).
June 11 ...	Inter-Club Meet at Buxton (Empire).
June 11 ...	Automobile Races, Ranelagh Club.
June 18 ...	Hill Climb (Hertfordshire A.C.).
June 27–July 2	Motor Bicycle Endurance Trial.
July 2... ...	100 Miles Passenger Trials (Motor Cycling Club).
July 9... ..	Driving Cup Contest (Derby A.C.).
July 23 ...	Sunrising Hill Climb (Midland A.C.).
July 26–27 ...	Reliability Trials for Motor Boats.
July 30 ...	British International Cup for Motor Boats.
Aug. 20 ...	Hill Climb (Derby A.C.).
Aug. 27 ...	Challenge Cup for teams of 6 (Motor Cycling Club).
Aug. 4 ...	Hill Climb (Kent A.C.).
Sep. [illegible] ...	Midland A.C. Speed Trials.
Sep. ...	Inter-Club Hill Climb, with Teams.
Sep. ...	250 Miles Trial (Motor Cycling Club).
Sept.	*Reliability Trials.
Sep. 10 ...	Lanark Hill Climb (Scottish A.C.).
1905.	
Mar. [illegible] ...	*Light Van Trials.
Mar. 3–11 ...	Liverpool Motor Cycle Show.

Foreign Events (Trials, Races, &c.).

1904.	
June	Dourdan Kilom. Trials (*L'Auto*).
June 7 ...	Namur Week.
June 17 ...	Gordon-Bennett Race.
June 22 ...	Kiel Motor Boat Races.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 15–23 ...	Ostende Week.
July 15–20 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 25–26 ...	Circuit des Ardennes (A.C. Belgium).
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 8-9 ...	Calais-Dover-Calais (motor boats).
Aug. 10 ...	Calais-Boulogne-Calais (motor boats).
Aug. 14–20 ...	Paris–Deauville Motor Boat Race.
Aug. 22 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Sept. 10-12 ...	Lucerne Motor Boat Races.
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14–22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

To Drive or not to Drive?—That is the Question.

Few people can have forgotten the chorus of enthusiasm with which the triumph of Mr. Edge in winning the Gordon-Bennett Race in 1902 was hailed both by the general and the automobile press of this country. We joined vigorously in that chorus, and to a certain extent led it ourselves. These are a few of the remarks we made at the time:—

> "Every English automobilist, and probably every Englishman, will be delighted with the triumph which has ultimately rewarded the dogged perseverance, pluck, and sportsmanlike qualities of Mr. Edge, in combination with the high engineering skill and admirable workmanship which have for so long been the leading feature of the Napier cars. . . . Grit and determination, though they may often be baffled, are sure in the end to succeed. The success they have in this instance gained is one which ought to be a source of pride to every Englishman, and particularly to everyone engaged in the automobile industry. . . . The triumph is, no doubt, to a large extent, a personal one for Mr. Edge himself. It is impossible to imagine any contest in which men can engage, demanding greater real courage or calling for a more pronounced exercise of all the faculties which go to make up a man."

It is, therefore, with a feeling of profound regret that we learn from the letter which Mr. Edge has directed to the Races Committee (and which we elsewhere reproduce) that he has followed up his protest, regarding the decision of the committee to exclude Mr. Earp and his car from this year's English team, by asking to be "relieved of the honour of representing the English Club in the International Gordon-Bennett Race."

It is a matter of supreme importance for the English automobile industry that an English car should, if possible, be victorious in this year's race, or failing actual victory that the English team should acquit themselves as well as possible. If Mr. Edge does not drive in the English team, the probability of that team securing the Cup will be seriously impaired. If he does not drive it will, in our opinion, be a misfortune for English automobilism.

With the hasty pronouncement of the Races Committee we have been far from sympathising. In a recent number we characterised it as precipitate, and approval of their action will not be increased by the consideration that according to an announcement which appeared in that *enfant terrible* of automobile journalism—the club *Journal*, and therefore presumably official, their decision ought not to have been given till after their return from the Isle of Man. There was ground, therefore, for protest, and possibly for strong protest. While Mr. Edge confined himself to protest, his position was unassailable, and probably the sympathy of nearly the whole automobile world was his.

Quite a different complexion, however, is given to the situation when from a protest Mr. Edge has proceeded to a threat—and to a threat which, if carried out, will have the effect of diminishing the hopes of Great Britain. Mr. Edge has always shown himself to be so good a sportsman that we feel convinced he will share our opinion, if he will pause for a moment to consider situations of a similar nature, connected with other forms of sport, in which the umpire, referee, or other constituted authority, may have once made his decision known.

Most people will, we think, agree that the essence of the sportsmanlike attitude is to accept loyally the ruling of constituted authority, even when you disagree with it, and even when, as in the present case, it may be open to criticism. Mr. Edge, as we have always said, has been so invariably sportsmanlike in all that he has done in connection with automobile racing that we feel confident he will recognise the correctness of this view. He will not, we trust, ultimately persist in weakening his country's chances of winning the Gordon-Bennett Race. If he hesitates, let him recall the generous enthusiasm which his victory of two years ago evoked—and relent.

Persistence in his present request, to be relieved of the honour of driving for Great Britain, is hardly likely to lead to the nomination of Mr. Earp. No representative body could put itself in the position of having the suggestion made that it yielded, to a threat put forward by a competitor, in a sporting event, what it refused to grant to the dictates of reason and the demands of fair play.

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Regulations for the Royal Parks.

LAST week we referred to the manner in which new regulations had been issued by Lord Windsor for motor vehicles using the public parks, and also referred to the possibly unconscious humour which included these regulations with those designed to effect the exclusion of verminous tramps and other "pests" from the same places of resort. It will be remembered that motor vehicles were to be subjected to such regulations as the Commissioners might subsequently promulgate. The Commissioners have not lost much time about doing this, and have issued the ukase which we reproduce in another column. It will be seen that in future no automobile will be allowed to proceed at more than 10 miles an hour in any of the Royal parks, though as a make-weight they may from now on use any road through the parks open to other traffic. We are frankly sorry for this speed limit; the single provision that they should not be driven so as to endanger the public would have been quite sufficient. Did the regulations apply solely to Hyde Park there might be some excuse for reducing speed, at any rate in some parts of the most frequented roads, but all the Metropolitan parks come under the regulations. When we consider that the London County Council have not felt called upon to ask for the 10-mile limit in crowded streets, there is a reactionary air about applying it where it is least needed which suggests that the enlightened and progressive views of the Local Government Board and its President are not shared by all Government Departments. Fortunately the regulations of the Commissioners are not like an Act of Parliament—they can be altered without much trouble. We live in the hope of seeing the progressive spirit of Mr. Long and the Local Government Board "informing" the deliberations of the Commissioners of Royal Parks so effectively that they may ere long see fit to abolish this 10-mile limit.

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The Effect of the Automobilist Triumph in the Divisional Court.

THE first occasion on which an automobilist was successful in a Divisional Court on a point of law was referred to by us last week, and our readers will call to mind that the ground on which the conviction, which formed the subject of the appeal, was quashed, was that several distinct criminal charges were mixed up in the summons, and that the same error was made in the conviction. At first sight it might appear that the publication of this information would only be of assistance to the police in the future, and would have the result of preventing their making similar mistakes in the case of such summonses as they might subsequently take out. There is, however, another aspect of the case which leads to the conclusion that automobilists may derive considerable advantage from the Lord Chief Justice's judgment. The reason why the police have made a practice of including a number of different offences in one summons is for the purpose of having all the charges heard at once in the hope that, if there is not sufficient evidence to convict on one, the evidence may be sufficient to procure conviction on another. This practice has now been pronounced bad in law, and will have to be abandoned in the future if the magistrates do not desire to have any convictions, they may in such cases make, quashed. If the police want to summon an automobilist for a number of different offences they must make separate charges of them, and the charges may not be heard at the same time, but must be heard consecutively. Now there is nothing that has so much acted as a check on unlimited persecution of automobilists as the way in which most of the cases have been fought, and the amount of time that they have taken up in consequence. Before the rise of automobilism, magistrates were accustomed to convict almost as rapidly as the French revolutionary tribunals used to polish off aristocrats arraigned before them. If a number of separate charges are to be brought in future, and each one heard separately, as they will now have to be, the result will be either to very materially diminish the chances of conviction or to greatly lengthen the proceedings; in either case, automobilists should obtain some benefit.

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Why not Repeat the Tisbury Tactics?

IN spite of the discouragement of the Local Government Board, and in spite of the fact that out of the two inquiries which have already taken place in regard to demands for the 10-mile limit made by local authorities, the Local Government Board has refused one of them, the Borough Council of Kingston-upon-Thames are asking the Board *both* to decree the 10-miles limit all over the borough, and also to close one of the roads known as Bank Lane to motor car traffic altogether. Local authorities are difficult to discourage. One would have thought that the cool commonsense of the circular which was addressed to them by the Local Government Board when promulgating their first regulations under the new Act would have served as a cold douche to their anti-automobilist fever. If that document did not teach them toleration probably nothing will. But it would certainly seem as if there were good grounds in the present case for introducing the tactics so successfully carried out at Tisbury, in Wiltshire. Our readers will remember that in that rural district, a movement was set on foot for petitioning the Local Government Board to close certain roads on the ground that they were less than 16 feet in width, and that this was promptly met by local automobilists obtaining an order from the Justices to have the said roads widened in accordance with the provisions of the Highways Act. The Kingston authorities would appear to be open to the same counter. The only valid ground upon which they can claim that motor car traffic should be excluded from one of their thoroughfares is that the thoroughfare in question is less than 16 feet wide. In that case, presumably, two Justices could issue an order to have it widened, and we believe the Kingston Bench possesses at any rate two Justices who are not anti-automobilists. In any case, considering the results of the Dover application, we don't think the reactionary Borough authorities of Kingston stand much chance of getting either of their objectionable applications agreed to by the L.G.B.

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Professional Drivers in the Gordon-Bennett Race.

Our remarks on the professional driver question, with reference to the French Eliminating Trials, have been applauded in several directions, and amongst the communications which we have received is one from Mr. S. F. Edge, who strongly supports our view that the alteration in the rules, permitting the mere nominees of clubs to drive, is a mistake. His letter is as follows:—

> "I am very pleased to notice that you are advocating a return to the original Gordon-Bennett rules, members of the competing clubs only to be drivers. I think, if while we are looking into the Gordon-Bennett rules, we could make other amendments, it would add to the international interest. Two years ago I advocated some restriction as to horse power and some restriction as to lightness of the car, merely because, in my opinion, it was the only way to keep the sport alive. Secondly, I think it should certainly only be for members of the automobile clubs of their respective countries. Thirdly, I think if a rule could make it absolutely necessary that the owner of the car only should be allowed to drive, it would all make up steps in the right direction. The professional mechanic-driver, who makes a living from driving, is a mistake in such competitions, and can only end in the eliminating of the competitions themselves."

The alteration, as already pointed out, was made at the instance of the German Club, which seeks to be very exclusive, and does not happen to have any first-class drivers among its members. The natural course of electing the drivers, who might be nominated, to be members of the club is one which did not commend itself to the exclusive tastes of the club, and hence the alteration which they proposed. But we think it would have been far better that the chances of Germany, or any other recognised club securing the Gordon-Bennett Cup, should have been weakened rather than that the new rule should have been passed. It was, at any rate, strenuously opposed both by the A.C.G.B.I. and the Belgian Automobile Club. Now, however, it is becoming so generally felt that the alteration was a mistake that we venture to hope that it may be considered advisable to reinstate the original rule before next year's competition. The whole subject of the re-modelling of the Gordon-Bennett rules, it has already been indicated, is becoming ripe for discussion, and will probably be brought forward seriously, at any rate before the A.C.G.B.I., at an early date. When that occurs, there will be an opportunity of discussing the other points suggested, of which Mr. Edge thinks alteration is required, these being the limitation of car power and requiring that competitors shall not only be members of the club to which they belong, but actual owners of the car they drive. The question of limiting car power in races has previously been discussed in the columns of this journal. It is, as we pointed out when dealing with the subject, a rather complicated one.

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South Africa as an Opening for the Automobile Industry.

Valuable information, confirmative of what we have from time to time put forward on this subject, has been recently provided by the Board of Trade Journal. Appearing in this publication, which is designed to act as a guide, philosopher and friend of British manufacturers and traders generally, it has, of course, a high degree of authority and reliability. The Board of Trade Journal explains that the importation of traction engines and motor wagons for industrial purposes is likely to undergo a very large increase in the near future in South Africa. The mining industry, as it develops, will require a large number of them, and it is of interest to learn that the internal combustion motor has distinct advantages for South Africa over the steam engine, as there are many districts in which water is scarce, and others in which though not particularly scarce, it contains so large a proportion of dissolved minerals as to very rapidly encrust boilers of the type usually employed on steam lurries and traction engines. For this reason there is a market open in South Africa for the internal combustion lurry which British manufacturers would do well to cultivate. It is significant, by the way, that this useful information incorporated in the British Board of Trade Journal is obtained from the recent report of the Belgian Consul-General at Cape Town. It is distinctly remarkable to find a British Government Department having to rely for information for British manufacturers on the report of a foreign consular agent, whose report is presumably designed to provide the data required by the manufacturers of his own country.

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Goring Bridge Motor Union Success.

Hitherto the toll for motor vehicles passing over Goring Bridge has been *6d.* a wheel, which, for an ordinary car, consequently amounts to *2s.* Yielding to representations made by the Motor Union, the Bridge Commissioners have consented to reduce this figure by one half. They have, however, attached the rather unpalatable condition that the motor vehicles must proceed across the bridge at a speed not exceeding four miles an hour. It is not quite clear from the terms in which the Commissioners have announced their decision whether, if anybody wants to go faster, he may do so, provided he pays the higher toll, though the language they have used certainly bears that interpretation. The situation would be an amusing one if an automobilist, in commencing to cross the bridge, were to be asked, "Will you go slow and pay *1s.*, or go quickly and pay *2s.*?" Presumably, however, though the Commissioners have not expressed themselves very well, they mean that they will reduce the toll, and not allow any motor cars to go faster than four miles an hour. We suppose that the chance of compelling motor cars to resort to this ridiculous pace was too delightful an opportunity for a local authority to neglect.

THE 20-H.P. SPYKER PETROL CAR.

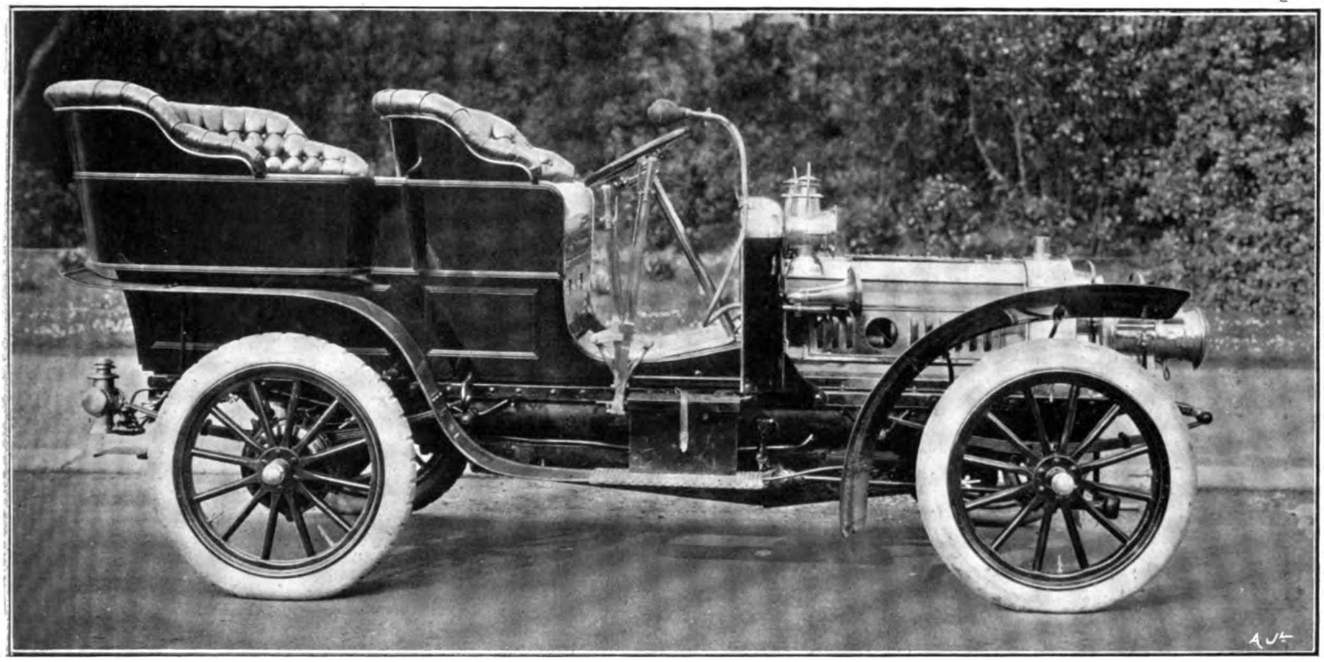
We have recently had the opportunity of taking a run on the car shown in our illustration, which is the first of the new Spyker models to reach the English agents for these cars—the Locomobile Company of Great Britain. It is one of their standard 20-h.p. vehicles, and is fitted with a tonneau body accommodating three persons. The car is one of the most comfortable and smooth-running vehicles now on the market, and is particularly remarkable for its silence and absence of vibration even in these days, when most first-class cars have been brought up to a very high degree of perfection in these respects.

The chief characteristics of the Spyker cars, generally, were dealt with in an illustrated article in our issue of January 2nd last, and although the vehicle which we are now considering differs in some respects from those referred to at that time, and has been modified to a certain extent to suit the English market, yet in the main that article is applicable to cars now being sold over here.

On this 20-h.p. vehicle, the cylinders are cast in pairs, with mechanically-operated inlet-valves on the one side and the exhaust-valves on the other side. The cylinder castings are more like those of other well-known engines, and are not of that Spyker type, in which these castings have a circular exterior. Both the cam-shafts project forward to the front of the car, where they drive the commutator and the circulating pump, which are located there. The commutator is used in conjunction with high-tension ignition plugs and a single trembler for all four coils, and there is a spare trembler fitted on the dash which can be connected up in circuit should the other trembler ever fail.

The engine has no automatic governor, but is entirely controlled by the driver. It is rendered very flexible by its "automatic" carburettor, and the throttle-valve is not only connected with a hand-lever on the steering-pillar but also with the clutch and the brakes. This hand-lever, as also that which regulates the time of ignition, is mounted in a somewhat unusual way on the steering-pillar, for it carries a small pinion wheel that engages with teeth on its quadrant. Both these levers can be operated from above the steering-wheel, since the wheel has only two spokes, and they normally lie forward. The connection of the throttle-valve with the clutch and the brakes serves to prevent the engine from "racing" at any time. The cylinders have a bore of 100 mm., the stroke is 110 mm., and the normal speed of the engine is 1,000 revs. per min.

An interesting provision is made for economising the fuel consumption, by enabling the driver to cut off the flow of petrol to the carburettor when the car is running down hill. This takes the form of an electro-magnetic device which holds the float up, so long as the driver depresses a small push-button on the steering-wheel.



The New Spyker Car.

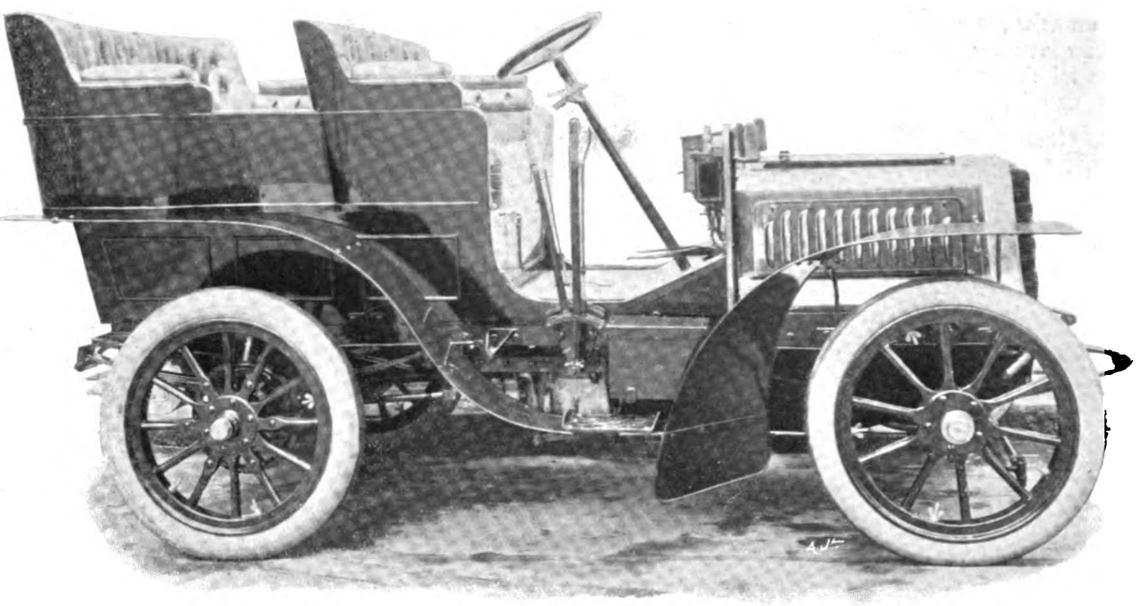
A very neat and convenient form of flexible bonnet covers the engine. The radiator, forming the front of it, is built up of finned tubes, and the water is circulated through it by a gear-driven pump, whilst the air is drawn through it by a belt-driven fan. The engine and the gear are closed in on the under side by a sheet aluminium casing, which has a smooth surface, and therefore does not raise much dust. The dash is very similar to those on the English-built Daimler cars, for it is curved inward both at the top and at the sides, and thus affords protection to the electrical apparatus fixed to it.

A special form of pressed steel frame is employed, and very long springs are used for suspending it above the axles. All four side springs lie outside the frame, and there is a transverse inverted spring across the back of the car to connect it with the rear ends of the side springs. The front springs are 40 in., the back springs 44 in., and the transverse spring 38½ in. long. The car is of the live-axle type, and the change-speed-gear provides three forward speeds and a "reverse." The propeller shaft has a universal joint at its forward end only, and the axle is connected with the frame by radius rods at each side. A very large cover is so arranged on the top of the gear-box that it is held down by a long flat spring, which can be removed in a moment. The gear gives a direct-through-drive on the top speed, and the engine is so flexible and powerful that the top speed is almost always used in practice. The standard tonneau car, which has a very pleasing appearance with its polished brass steering pillar and side levers, has a wheel base of 7 ft. 8½ in., but the chassis is lengthened and given a 9 ft. wheel base when built for bodies of the phaeton side entrance type. All four wheels are shod with 32 in. by 4⅛-ins. pneumatic tyres.

Two other models are also sold by the Locomobile Company; they both have 4-cylinder engines, and are of similar construction throughout. The 14-h.p. car has a wheel base of 7 ft. 2½ ins. for the tonneau, or 7 ft. 11 ins. for the phaeton body, and its tyres are 30 ins. by 3½ ins. The bore and stroke of the cylinders on this model are 90 and 100 mm. respectively. The other car has a 25-h-p. engine, and its wheels are shod with 34-in. by 5-in. tyres. In all these vehicles, special attention has been given to the quality of the materials employed, and nickel steel is very largely used in their construction. The makers, too, have an unusually complete and up-to-date equipment of machine tools, and consequently the workmanship is of a very first-rate character.

THE 1904 CLEMENT PETROL CARS.

(*Concluded.*)



A Twin-cylinder 9–11-h.p. Standard "Clement" Tonneau.

The Engine.

The engine is seen fixed in place from the right and from the left sides of the car, respectively, in Figs. 6 and 7. The cylinders have a bore of 88 mm., and the stroke is 130 mm. Each cylinder casting forms one pair of cylinders, and all the valves—which are interchangeable—are operated from the same cam-shaft. The arrangement of the valves and of the pipes communicating with them, are well seen in Fig. 7. The usual high-tension system of ignition is adopted, the ignition-plugs being fitted into the inspection-covers above the inlet-valves. The whole of the gearing driving the cam-shaft, together with the cam-shaft itself, is enclosed in the partinium crank-chamber, and all the valves are mechanically operated in the usual way; the governor also, which is mounted on the cam-shaft, is completely enclosed, and the commutator is arranged externally on the front end of the cam-shaft.

A Longuemare carburettor is usually employed in conjunction with the engine, although some of the cars sold by Mr. E. H. Lancaster—the English agent—have been provided with the "Lewis" automatic carburettor instead. In either case, the carburettor is fixed on the right side of the engine, as seen in Fig. 6, and it has a hand-controlled throttle-valve, which is quite distinct from the throttle-valve which is connected with the governor. The Longuemare carburettor when fitted—as it was on the chassis from which our photographs were taken—is rendered automatic by an additional fitting known as the "autodoseur Clediaber," of which we shall give full particulars presently. The carburettor, A, itself is connected by a single induction-pipe, A^1—which passes across between the two cylinder castings—with the throttle-valve, A^2 (Fig. 7), from which the branched induction pipe is led to each pair of cylinders.

The engine is controlled by two small hand-levers on the steering-pillar, the one regulating the time of ignition, and the other acting upon the throttle-valve that forms a part of the carburettor; its speed is also regulated automatically by the governor, and the action of the governor upon the throttle-valve, A², is subject to the control of an accelerator pedal, which the driver can depress with his foot. The engine is capable of giving 20-b.h.p. at a speed of 1,200 revs. per min.

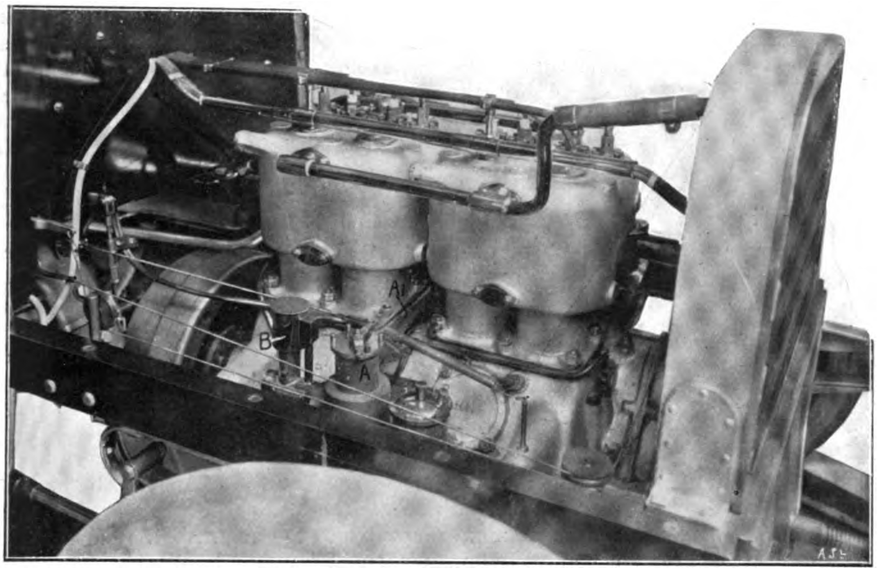


FIG. 6.—View of the Engine on the 16–20-h.p. Clement Car from the off side, showing the Carburettor with its Automatic Attachment.

The cooling water is circulated by a centrifugal pump, which is driven by friction off the flywheel. It forces the water through the jackets to the radiator, forming the front of the bonnet, and the water system is supplemented by the tank to which we have already referred. The radiator is of the multitubular "Loyal" type, which is already well known to our readers. The petrol tank has a capacity of about 8 gallons, and the feed from it to the carburettor is by gravity. Two batteries of accumulators are usually fitted for operating the ignition, either of them being brought into use alternatively by the switch. When specially ordered, a high-tension magneto can be fitted—either to supplement or to replace the accumulators—but this is not provided on the standard cars. The engine is lubricated from a sight-feed fitting on the dashboard in which pressure is maintained by the circulating water. A small hand-pump is also available for forcing oil to the crank-chamber when desired. The water-circulating pump, too, can be lubricated by the driver, a grease cup for it being fitted behind the dash.

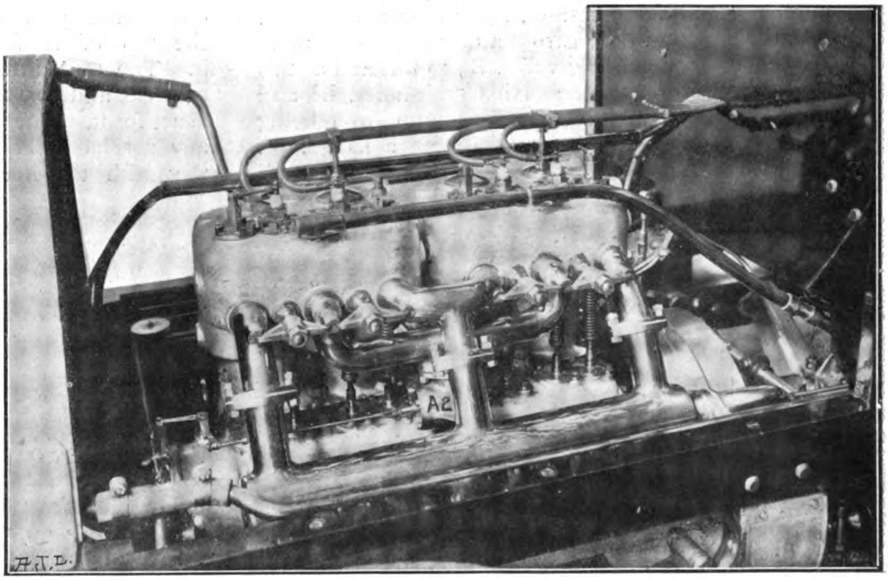


FIG. 7.—The "Aster" Engine on the 16–20-h.p. Clement Car, from the near side, showing the Valves and Igniters.

The engines fitted to the other Clement cars are of very similar design and are arranged in the same way as that we have just described. The twin-cylinder 9–11-h.p. engine has a bore of 88 mm. and a stroke of 140 mm., and the four-cylinder 10-h.p. engine has a bore of 84 mm. and a stroke of 120 mm. The cylinders on the large 20–26-h.p. Vinot-Deguingand have a bore of 130 mm. and a stroke of 120 mm.

The Autodoseur "Clediaber."

The function of this fitting is to maintain an approximately constant degree of vacuum in the mixing chamber of the carburettor at all times, and to thus render the richness of the mixture approximately constant whether the engine is running slowly or fast, and whether on full load or no load. It is fitted to the carburettor in such a way that the whole of the air finding its way to the carburettor must pass through it, and it is made in such a way that the resistance offered by it to the air is automatically controlled by the suction in the mixing-chamber.

This apparatus is, in Fig. 8, shown both complete and in parts. The main casting, B, is open to the atmosphere at its one end, and the hole, B¹, is of such a size that sufficient air can find its way through it, alone, for feeding the engine at slow speeds and on light loads. The hole, B¹, however, is too small to admit sufficient air at other times, so that the tendency would then be for a partial vacuum to be formed in the mixing chamber, when the engine was running faster and when the throttle-valve was open to any considerable extent. In order to prevent this increased suction from continuing to increase, auxiliary air-holes, B^3, are cut through the upper portion of the casting, B, and through these holes more air can, when necessary, enter the carburettor. The holes, B^3, are normally closed by a sliding valve, B^5, which falls by gravity, and can be weighted to the required extent by placing shot inside it. It is of larger diameter at its upper end, and this portion of it forms a piston inside the upper portion of the casting, B. The top of the casting, B, is closed by an air-tight cap, B^6, and the large cylindrical space above the sliding valve, B^4, is placed in open communication with the lower portion of the casting, B, by the external pipe, B^4. As the suction in the carburettor increases, so there is a tendency for the sliding valve, B^5, to lift, and as this valve is lifted, it opens the auxiliary air-holes, B^3, and prevents a still greater degree of vacuum from being formed. The casting, B, is provided with a flange, B^2, by which it is bolted to the carburettor, and it has small holes, B^7, drilled through it, so that the underside of the piston portion of the valve, B^5, is at all times in open communication with the atmosphere.

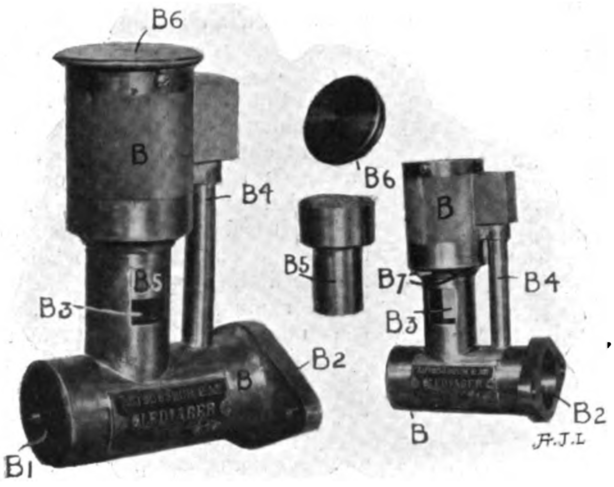


Fig. 8.—The Clement Automatic Carburettor Attachment "Autodoseur." Shown complete and in parts.

The "Lewis" Carburettor.

The Lewis carburettor is rendered "automatic" on the same general principle as the well-known "Krebs" carburettor, but is so designed that the injecting action of the air passing the spray jet is reduced at the same time that a greater proportion of air is allowed to pass direct, and uncarburetted, to the induction pipe. Its construction is well shown in Fig. 9, in which views are given of the complete carburettor and of the separate parts of which it is composed.

The main portion of the carburettor consists of an aluminium casting, C, which is cylindrical in shape and has flanged pipe connections formed outside it, at the top and at the bottom, for receiving the induction pipe and the main air supply pipe, respectively. The main air supply, therefore, enters the casting, C, at C^1, and the explosive mixture is led out from it at C^2 to the engine. The casting, C, is fitted with a cover plate, C^3, and through the centre of this plate passes a hollow spindle which connects an internal throttle sleeve, C^4, with an external lever, C^5. The sleeve, C^4, fits the inner wall of the main casting, and has a slot cut through its periphery as seen; it acts as a throttle valve which can be made to control the size of the orifice through which the explosive mixture passes to the engine. The lever, C^5, is connected with a small hand-lever on the steering pillar, by which it can be operated by the driver.

Into the base of the casting, C, fits the spray jet, D^4, which is arranged in the usual way in conjunction with the float-feed-chamber, D, and projects up inside the mixing-chamber. The jet, D^4, has a screw thread cut outside it to prevent any petrol which may flow out from the top of it from running straight down outside it. The thread forms a long path for such petrol to traverse, and exposes a larger evaporating surface than usual for it. The float-feed-chamber does not call for any special description, as it is constructed in the usual way with the needle valve, D^2, passing through the

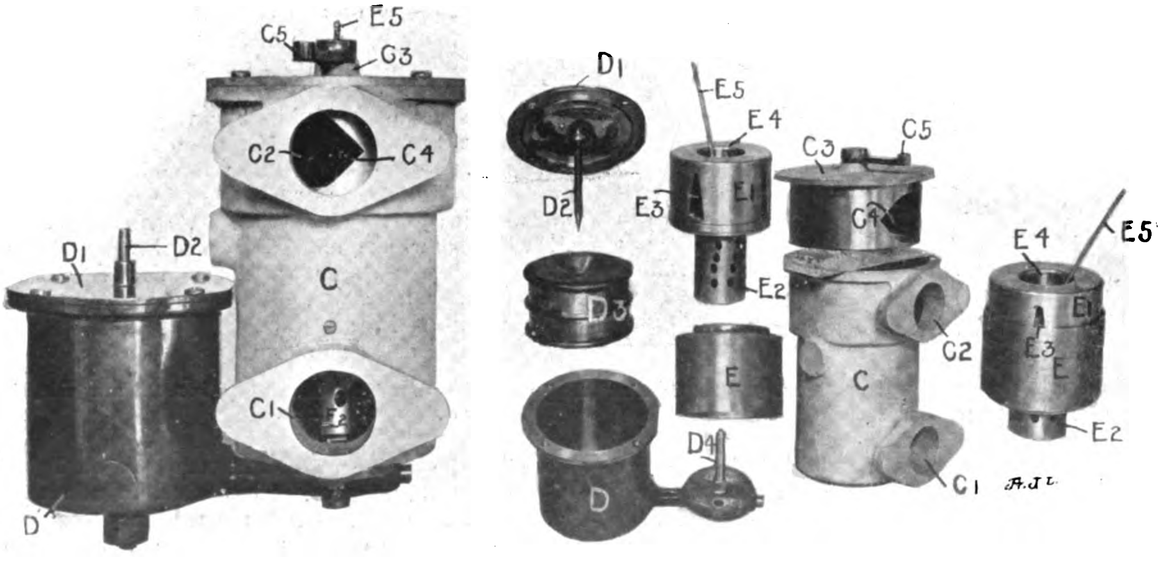


Fig. 9.—The "Lewis" Automatic Carburettor which is fitted by the English Agents to some of the Clement Cars. The Carburettor is shown complete and taken apart.

cover, D^1, and with the float, D^3, inside it. The float automatically maintains the petrol at a constant height inside the chamber, D, and therefore in the jet, D^4.

Inside the casting, C, is fitted the brass sleeve, E, the top of which lies just below the hole, C^2. This sleeve forms a cylinder for the sliding-valve, E^1, to fit into, and it is open at both ends. The valve, E^1, is larger in diameter at the top than it is beneath, and the upper portion has V-shaped slots, E^3, cut through it, up which the air can pass freely from below without going through the central tubular portion, E^2. The central portion, E^2, may be regarded as a tube forming a passage right through the valve from the bottom to the top. It encircles the spray-jet, D^4, at its lower end, and is perforated as seen with a number of holes drilled at a downward angle through it. The carburetted air passing up through it emerges into the upper portion of the casting, C, through the central hole, E^4, and thence finds its way through the throttle-sleeve, C^4, to the engine.

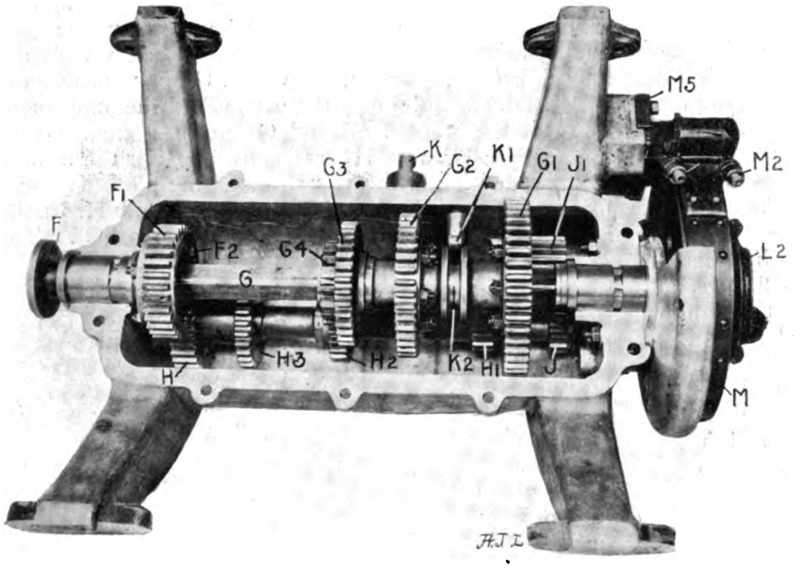


Fig. 10.—View of the Change-Speed-Gear on the 16–20-h.p. Clement Car, taken from above with the cover removed. The Foot-Operated Brake is seen at the rear end of the Gear Box.

The valve, E^1, slides down into the sleeve, E, by gravity when the engine is at rest, and then the ports, E^3, in its walls, are completely closed by the sleeve, E. If the engine is then started, the whole of the air entering the casting, C, at C^1, finds its way through the perforations in the tube, E^2, or up beneath it, past the jet, D^4, and out through the hole, E^4, to the upper portion of the carburettor. The whole of this air, therefore, is thoroughly carburetted, and a rich mixture is obtained. The inside of the tube, E^2, is bored out conical, the hole having a larger diameter at the bottom than at the top; there is, therefore, a smaller annular space around the spray jet when the valve, E^1, is in its starting position than there is subsequently, and consequently the air has a greater injection action upon the petrol.

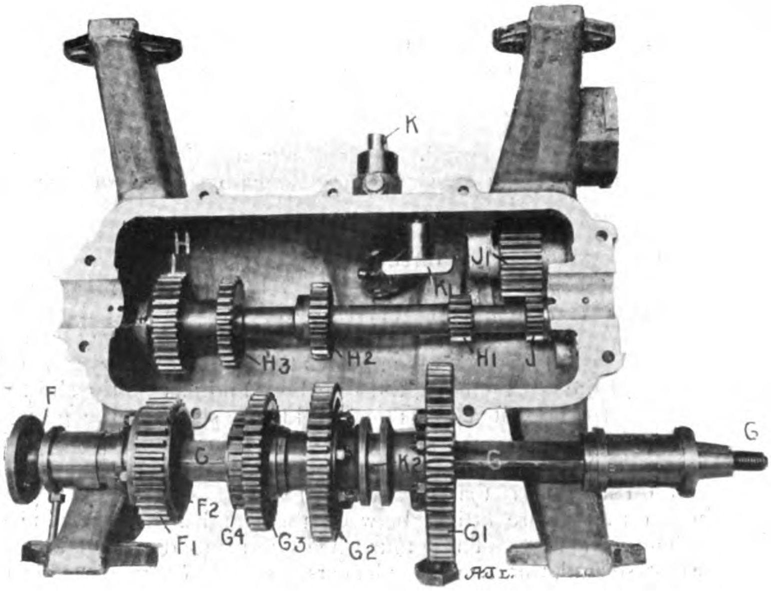


Fig. 11.—The Clement Change-speed-Gear with the Direct-Through-Shaft lifted out and laid alongside the Gear Box.

After the engine has been started, a partial vacuum is formed in the upper portion of the casting, C, and this has the effect of causing the valve, E, to rise inside the sleeve, E^1. A certain amount of air is then allowed to pass direct through the ports, E^3, from the lower to the upper portion of the casting, C, without becoming carburetted. At the same time there is a larger annular space provided between the spray jet, D^4, and the inner wall of the perforated tube, E^2, so that even the air which does pass the jet has not as strong an injecting effect upon the petrol as it otherwise would have. The degree to which the valve, E^1, rises above the sleeve, E, depends upon the degree of vacuum formed in the upper portion of the casting, C, and therefore a greater proportion of diluting pure air is allowed to pass through the carburettor as the engine runs faster, and an approximately constant degree of richness of mixture is thus at all times assured.

The casting, C, is so fixed to the float feed chamber that it can be turned round about its axis to any position that may suit the pipe-connections on the engine to which it may be fitted. The wire, E^5, which is seen projecting upwards from the valve, E^1, in our illustrations, passes centrally through the top of the carburettor; it indicates the position of the valve at any time, and enables the valve to be raised or lowered by hand if at any time desirable. It will be noticed, too, that the valve, E^1, has a piston ring fitted around it, but this is usually removed when the carburettor is employed on a four-cylinder engine, because the "dash-pot" action which it gives is not then necessary, and the absence of the ring renders the automatic action more sensitive.

The "Lewis" carburettor is the design of Mr. E. W. Lewis, who was until recently with the Daimler Motor Company, of Coventry, but has now joined the Rover Company, who are manufacturing this ingeniously-designed automatic carburettor. The carburettor appears to give remarkably good results in practice, and to render engines fitted with it unusually flexible.

The Transmission Gear.

The arrangement of the main-clutch, the change-speed-gear, the propeller-shaft, and the live-rear-axle is, in general respects, the same as on other cars of a similar type. The clutch is of the internal type, and its inner member has a leather-friction surface. This member is free to slide upon a short square shaft that has a flange coupling at its rear end, and is bored out to take the end of the crank-shaft at its front end. The coupling between it and the gear-shaft is formed with a small intermediate block of metal between the two flanges, so that, when the block is removed, the gear or the clutch can be dismantled independently. The clutch-spring lies between the flywheel and the inner clutch member, and there is a ball-thrust bearing behind the end of the spring, although no end strain is imposed upon either shaft when the clutch is in engagement; a ball-thrust collar is also provided for the foot pedal to press up against.

The outer clutch member is formed by a metal ring having a conical inner face; the ring is fixed to the flywheel at intervals by bolts passing through the rim. The clutch pedal is pivoted to the casing of the steering-gear, and is so designed that it can be interconnected with either or both brakes, if desired.

The gear-box, with its cover removed, but with the shafts and spur wheels in place, is shown from above in Fig. 10. In this illustration the foot-operated brake is mounted in place immediately behind it. In Fig. 11 the direct-through-shaft has been lifted out of the box and is seen lying alongside it. This gear gives four forward speeds and a "reverse," and when the top speed is in use the power is transmitted direct through the upper shaft, although the lay-shaft lying beneath still revolves idly.

The coupling flange, F, is that to which the clutch shaft (already referred to) is directly bolted, and this coupling is connected with the spur-wheel, F^1, by a short shaft passing through the main bearing at the front end of the gear-box. Fitting into the rear end of this short shaft is the shaft, G, which passes through the main bearing at the other end of the gear-box, and has its front end turned to fit a brass bush inside the short shaft. The shaft, G, has a square cross-section inside the gear-box, and it carries the four spur-wheels, G^1, G^2, G^3, and G^1, in such a way that they are free to slide along it, although the square fitting, between them and it, enables them to drive it. These four wheels correspond with the first, second, third, and fourth gears, respectively. The four wheels are separately renewable, but are all bolted rigidly together by a sleeve in which the groove, K^2, is formed for enabling them to be slid longitudinally.

The spur-wheel, F^1, has a few internal teeth, F^2, formed inside it, and these teeth correspond with those on the spur-wheel, G^4. The wheel, F^1, is at all times in mesh with a wheel, H, on the lay-shaft beneath it, and the lay-shaft is fitted with four other spur-wheels, which are all rigid with it. The wheels, H^1, H^2, and H^3, alternatively mesh with the wheels, G^1, G^2, and G^3, or the wheel, J, can be caused to drive the wheel, G^1, in a reverse direction through the intermediate pinion, J^1, which is at all times in gear with the wheel, J. The wheel, J^1, is free to revolve idly upon a stationary steel pin, and it is so mounted that the wheel, J^1, comes into mesh with it when the wheels on shaft, J, are slid rearwardly as far as they will go.

In Fig. 10, the gear is shown in its neutral position, in which none of the wheels on the lay-shaft engage with those on the upper shaft. When the sliding wheels are moved forward, however, the wheel, G^1, first engages the wheel, H^1, and subsequently, with still further movement forward, the wheels. G^2 and G^3, in turn engage with the wheels, H^2 and H^3, respectively. For these three lower speeds, and for the "reverse," the power is therefore transmitted through the wheels, F^1 and H, to the lay-shaft, and from the lay-shaft to the upper shaft. The top-speed, however, is obtained direct from the wheel, F^1, to the shaft, G, because the wheel, G^4, then engages with the internal teeth, F^2.

The Carburettor.

A	Longuemare carburettor.
A^1	Induction pipe.
A^2	Throttle-valve for governor.
B	"Autodoseur."
B^1	Main air inlet.
B^2	Flange connection for induction pipe.
B^3	Auxiliary air holes.
B^4	Suction pipe to automatic valve.
B^5	Automatic sliding valve.
B^6	Air-tight cap.
B^7	Air holes.

The "Lewis" Carburettor.

C	Mixing chamber.
C^1	Air inlet.
C^2	Mixture supply outlet.
C^3	Cover of mixing chamber.
C^4	Throttle-valve sleeve.
C^5	Lever-operating throttle.
D	Float-feed chamber.
D^1	Cover.
D^2	Needle valve.
D^3	Float.
D^4	Threaded spray jet.
E	Brass valve-sleeve.
E^1	Sliding valve.
E^2	Perforated sleeve.
E^3	Auxiliary air ports.
E^4	Mixture port.
E^5	Agitator wire.

The Change-Speed-Gear.

F	Coupling on gear shaft.
F^1	Wheel driven by clutch.
F^2	Internal teeth.
G	Through-shaft.
G^1	First-speed-gear wheel.
G^2	Second ,, ,,
G^3	Third ,, ,,
G^4	Fourth ,, ,,
H	Driven gear-wheel on lay-shaft.
H^1	First-speed-gear wheel.
H^2	Second ,, ,,
H^3	Third ,, ,,
J	"Reverse" wheel on lay-shaft.
J^1	Intermediate "reverse" pinion.
K	Operating rock-shaft.
K^1	Shoe.
K^2	Groove on shaft G.

The Brakes.

L	Brake-drum casting.
L^1	Ratchet teeth.
L^2	Universal joint member.
M	Brake band.
M^1	Fixed fulcrum-pin.
M^2	Adjustable links.
M^3	Operating lever.
M^4	Disengagement spring.
M^5	Stationary bracket carrying M^1.

Table of Reference Letters for the Clement Car Illustrations.

The sliding spur-wheels are controlled in the usual way by a hand-lever placed at the side of the car, this lever being connected by a simple system of levers with the short rock-shaft, K, that passes through the side of the gear-box. The shaft, K, has an inner lever-arm affixed to it, and to the upper end of this arm is pivoted the steel shoe, K^1, that rides in the groove, K^2.

The gear-box itself is made of partinium, and is cast in one piece; the cover is formed by a separate casting, and the joint between it and the box passes through the centre of the two main bearings. The bearings at each end of the lay-shaft are formed by brass caps, which fit over it, and these are ingeniously fixed in the ends of the gear-box in such a way that the lay-shaft can be easily lifted out. The brass cap at the one end is carried in an intermediate casting, and this casting is secured in place by a couple of external studs. The four projecting feet, by which the gear is fixed in place in the chassis, form a part of the same casting, and there is also a projection from the side of one of the feet for receiving the bracket, M^5, which holds the brake-band, M, in place.

The whole of the gear runs in oil, and the two main bearings are fed with grease from a large "screw-down" lubricator on the dash-board. It will be noticed that the gear-wheels have large teeth.

Fixed to the rear end of the shaft, G, is a casting, L, which forms the brake-drum, and also has projecting lugs, L^2, that form a part of the universal joint by which the shaft, G, is connected to the propeller-shaft. The propeller-shaft itself is enclosed in a steel tube, which is rigidly fixed at its other end to the casing surrounding the differential gear on the back axle. The universal joint is enclosed in a leather casing, and is thus rendered dustproof. The steel tube contains brasses at either end, and these are fed with grease from a lubricator that is connected with them by a branched pipe led from a lubricator behind the axle. The small bevel wheel which is fixed to the end of the propeller shaft is shown in Fig. 12, as also is the large bevel wheel, which is bolted to the differential. In this illustration, too, is seen the differential itself with its four bevel planet wheels exposed to view, and one of its concentric bevel wheels lying alongside. A ball-thrust-bearing is fitted behind the bevel pinion, and the back axle itself has its live shaft mounted in ball bearings.

The stationary portion of the live-axle contains a mixture of oil and grease, and there are external lubricators fitted to each of its end bearings. The 16-20-h p. car is usually geared so that it can attain a speed of about 38 miles per hour on the top gear, but it is possible to change the bevel wheels so as to slightly increase or reduce the gear ratio to suit any special requirements.

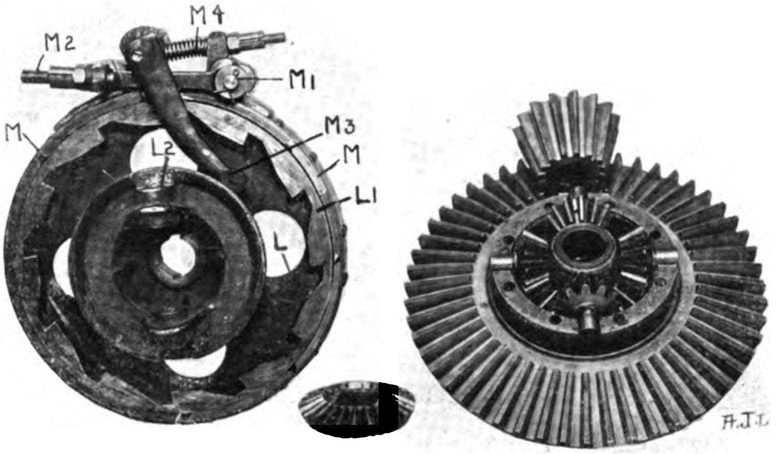


Fig. 12.—The 16–20-h.p. Clement Car. The Foot-Operated-Brake and the Differential-Gear with the bevel wheels that drive it.

The Brakes.

The brakes, which are of the band type, are all similar in general design and are of special construction; those acting direct on the hubs of the driving wheels are lined with hair belting, whilst the foot-operated brake behind the gear-box has metal-to-metal friction surfaces. The former brakes are perhaps best seen in Fig. 5, whilst the latter is clearly shown separate, two different points of view, in Figs. 10 and 12. Referring to these last illustrations, it will be noticed that the brake-band, M, has outwardly-projecting lugs rivetted to it at each end. The one lug rests up against the fixed bracket, M^2, through which the pin, M^1 passes. The other lug is normally held up in place by a yoke carried by the links, M^2, and the ends of the band are forced apart by the spring, M^4. The lever, M^3, is so mounted that, when its end is drawn over towards the right side of the car, it tightens the band up against the drum, L. For this purpose it is pivoted to the last-mentioned lug, and is connected with the first-mentioned lug by the pin which passes through the spring, M^4, and is hinged to the lug; the lever, M^3, thus forms a toggle that acts direct upon the two ends of the brake-band. The links, M^2, are provided with adjustment-screws, and there is also an adjustment-nut for the spring, M^4, so that any wear that takes place can be easily taken up, and the position of the brake-pedal can be adjusted.

It will be noticed that the casting, L, has ratchet teeth formed inside it. A pivoted lever which acts as a pawl is fitted in conjunction with them, and is so arranged that the driver can allow it to engage with them whenever necessary. It normally is held clear of them, but is used in the same way as an ordinary sprag for preventing the car running backwards down hill.

The entire car appears to be constructed of good material throughout, and the workmanship is also very good in all respects. The other Clement vehicles are, as we have already said, of very similar general construction, although, of course, the dimensions differ a good deal. The 9–11-h.p. twin-cylinder car has a wheel-base of 6 ft. 4 in., and the track is 4 ft. 2 in.; on it the change-speed-gear provides three forward speeds instead of four. The 10-h.p. chassis which, as we have said, is a four-cylinder model specially designed for town vehicles, has an 8 ft. 5 in. wheel base, and the same track as the smaller car, whilst the 20–26-h.p. chain-driven vehicle has an 8 ft. 7 in. wheel base, and a 4 ft. 4½ in. track.

The sole English agent for these cars is Mr. E. H. Lancaster, whose extensive premises and showrooms are at 3, Leicester Street, Leicester Square, W.C.

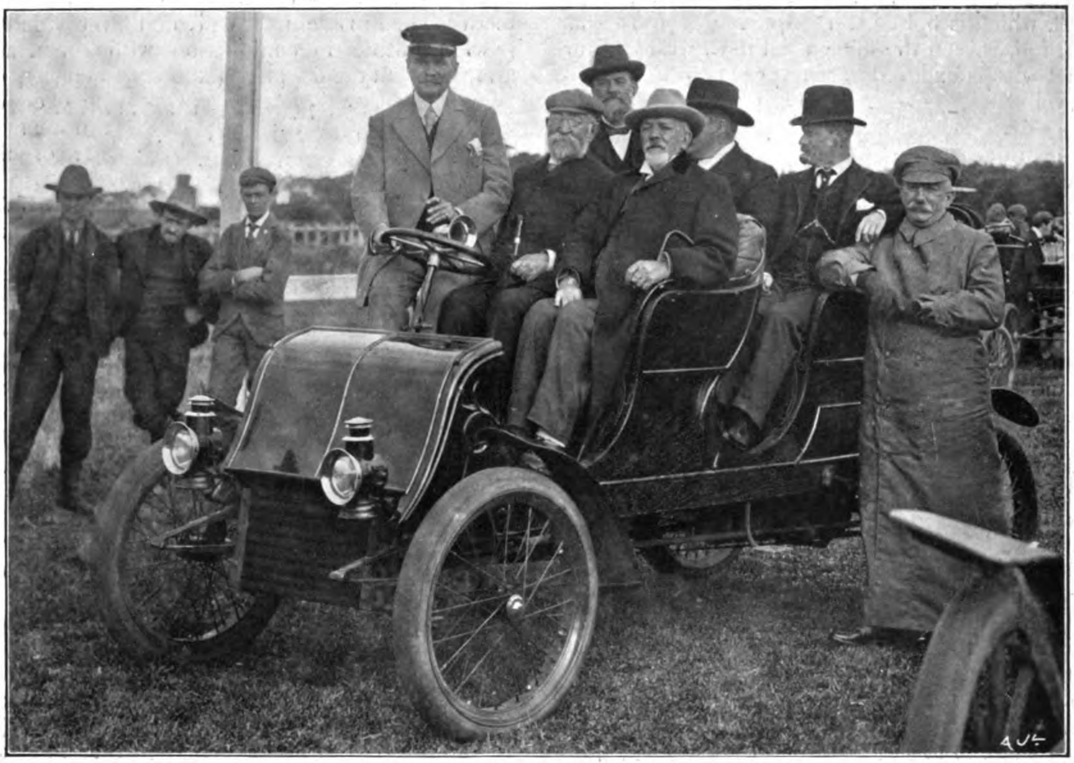
The movement on the part of railway companies to employ vehicles propelled by internal combustion engines, for coping with the traffic on branch lines, where regular trains do not pay, is spreading to Germany, and the Bavarian Minister of Traffic has issued an invitation for tenders for the delivery of railway motor carriages. At the same time the Minister of Traffic has also invited tenders for motor cars designed for road postal service. Five classes of vehicles are to be employed for this purpose, three kinds being used for town traffic and two for work on the country roads. The country cars are to convey several passengers as well as mails, and a special class of low-powered postal cars is to be built for the conveyance of parcels and light goods, sent by rail, to outlying districts away from the railways.

THE SUTTON "HEAVY" OIL ENGINE.

THE motorist of to-day is so accustomed to using petrol as the natural fuel for his car that it is difficult for him to realise how short a time it is since that fuel was regarded by many pioneers of the automobile industry as being of too dangerous a character for general adoption on motor vehicles. At that time, however, this impression was very generally entertained, and even amongst makers of petrol engines there was a strong feeling that the use of petrol was more or less temporary, and that the time was not far distant when ordinary lamp oil would be used instead. Now that experience has shown the anticipated dangers attending the use of petrol to have been vastly exaggerated, the importance of constructing automobile engines in such a way that they will use kerosene has naturally decreased, and although the motoring public would still welcome a thoroughly satisfactory kerosene engine to replace the modern petrol engine, yet the chief advantage that would appeal to them would be one of cost of fuel rather than of additional safety. At the present time the average motorist merely associates "heavy" oil engines with dirty cylinders and evil-smelling exhaust, and although we have on several occasions dealt with the kerosene problem at some length in our columns, yet the interest taken generally by automobilists in the matter is so small that many of them are unaware of the enormous amount of time and money that has been spent upon their development, and are unfamiliar with the reasons why such engines have only met with so small a measure of success hitherto. We have reason to believe that it is not even recognised generally that considerably more power can be got out of an engine of a given size when using ordinary lamp oil than when running it on petrol, and that if the kerosene apparatus can be so made as to ensure perfect combustion at all times, that the objectionable features associated with these engines would be entirely eliminated.

It is just this question of ensuring complete combustion at all times that has been the great difficulty in the past, and that has led many inventors to adopt entirely different principles for vaporising the fuel from those which are employed with considerable success on stationary slow-speed engines. The usual manner adopted for vaporising kerosene is to subject it to a sufficient temperature to convert it into a gas, and when the quantity of oil required by the engine remains constant—as it does in most stationary engines—there is no very great difficulty in maintaining the necessary constant degree of heat. On automobiles, however, both the speed of the engine, and the amount of work which it is called upon to give, are constantly varying over a very wide range, and it is then extremely difficult to prevent the heat of the vaporiser from varying to such an extent that the oil is either "cracked up," by excessive heat, or is imperfectly gasified through not being hot enough.

We have had considerable experience with one totally different method of vaporising kerosene for use with internal combustion engines, and are conse-



THE SUTTON KEROSENE ENGINE.—Our photograph shows a 10 h.p. Winton Car adapted by Mr. Henry Sutton, A.I.E.E., to use ordinary lamp oil. This car is the property of Dr. Merrill, Vice-President of the A.C. of Victoria, Australia, who is holding the steering wheel. The gentlemen seated upon it are Melbourne City Councillors, including Mr. S. W. Winter (Editor of the *Herald and Standard*), Sir Samuel Gillott (ex-Mayor) and—on the back seat—Councillor Pleasance, Councillor Jeffreys, and Alderman Maloney. Mr. Frank Struart, M.P., is standing by the side of the car.

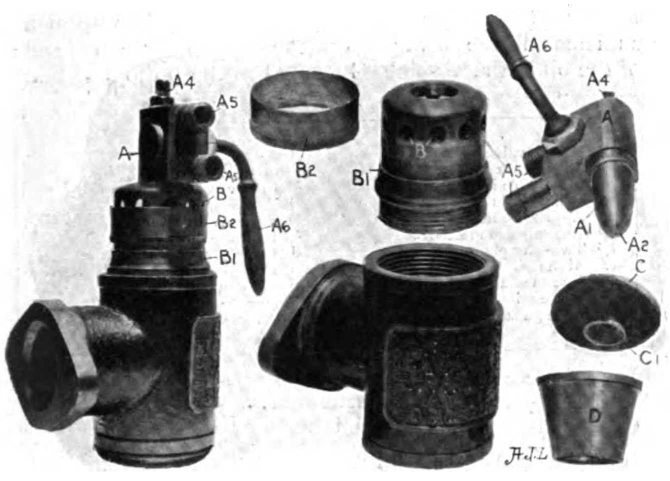


FIG. 1.—The Sutton Kerosene Engine.—View of a Pulveriser, complete and in parts.

quently in a position to say that the principle involved has great possibilities of success when fully developed, although hitherto there have been a few difficulties connected with it that have prevented it from becoming a commercial success. This principle consists in spraying the oil so as to form it mechanically into a vapour, to allow it then to pass (mixed with air) into the engine cylinder, and to use it there before it has time to recondense. No heat is *necessary* with this system, although the chances of condensation are considerably reduced when once the engine has been allowed to become warm. It is, however, necessary that the oil shall be thoroughly sprayed and intimately mixed with the entering air, so that, if the suction of the engine itself is used for spraying the oil, it is somewhat difficult to *start* the engine on kerosene, because it is impossible to turn it round sufficiently quickly by hand. With this system, considerably higher explosion pressures are obtained than when using petrol, and the efficiency of the engine is a good deal greater than that of an ordinary stationary oil engine. From tests which we have ourselves made on engines of this kind, we have found the oil consumption to be even less than two-thirds of a pint per b.h.p. hour, and the initial explosion pressure has been shown to be as high as 480 lbs. per sq. in. The difficulties, however, of using kerosene in this way, as compared with those met with in petrol practice, appear to be that the richness of the mixture cannot satisfactorily be varied to so great an extent without risk of missing fire, and that the engine is apt to be a good deal less flexible for this and similar reasons.

This interesting question of the use of kerosene for automobile engines on the "spraying" principle has been brought to the fore again recently by the work done in Australia by Mr. Henry Sutton, of Melbourne, who has apparently met with a large measure of success, and has, as the result of several years' careful experiments, devised a very simple form of mechanism for adapting engines to the use of this fuel. We have not as yet had an opportunity of personally testing any of the engines fitted by him, but are now able to give an illustrated description of his special mechanism, and hope to be in a position to report upon the performances of an engine fitted with it, in this country, before very long. Whether Mr. Sutton has succeeded sufficiently in completing the solution of the kerosene problem to render the adoption of this fuel general, or not, the apparatus employed by him cannot but be of interest to many of our readers because progress in the development of automobiles and motor boats—particularly as applied to commercial use—depends to so great an extent on the cost and safety of the fuel that they use.

One of the actual kerosene attachments made for an existing petrol engine is shown in Fig. 1, and the various portions forming this apparatus are also seen separately in the same illustration. In Fig. 2 is represented a similar kerosene attachment, but in this case it is combined with an atmospheric induction valve and with an ignition plug in such a way that all these parts can be together bolted to the cylinder of an engine, and that they form a separately detachable unit in themselves; this combined mechanism has been more especially manufactured for demonstrating the Sutton principle than for actual practical use, although it is applicable in certain cases to engines, provided that the cylinders have the usual exhaust-valves arranged in them. The various parts are seen detached from the main casting in Fig. 3. In both forms of apparatus the portions that atomise the

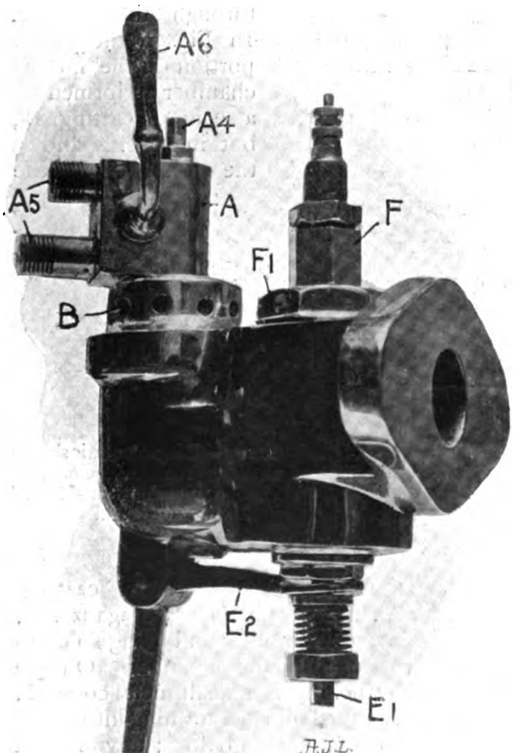


FIG. 2.—The Sutton Combined Pulveriser, Induction Valve, and Ignition Plug Fitting.

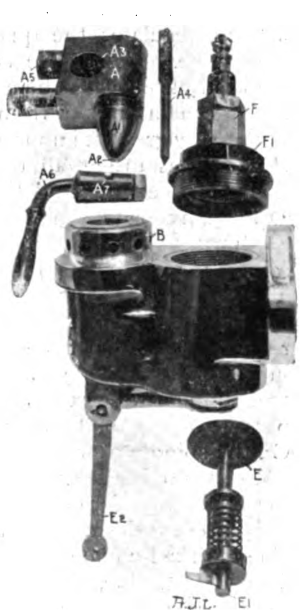


FIG. 3.—The various parts of the Sutton Combined Fitting shown in Fig. 2.

kerosene and mix it with the air are practically identical, and their arrangement in relationship to one another will perhaps be most readily understood by referring to Fig. 4, in which the pulverising apparatus is shown sectionally.

The fuel is led to the upper fitting, A, which constitutes a combined two-way cock, needle-valve control, and spray nozzle. Two separate pipes are led to it, and these are connected by unions to the nipples, A^5; the one pipe is led from the main fuel tank, which contains kerosene, and the other from a small petrol tank which is only needed for starting the engine. The two-way cock is formed by the conical plug, A^6, which fits into the conical seating, A^3, in the casting, A. The plug portion of the cock has a slot, A^7, cut across its face, and there are three holes leading into the conical seating, A^3, in the neighbourhood of the slot, A^7. These holes are in open communication with the pipe fittings, A^5, and with the needle-valve, respectively, and they are so placed in relationship to the slot, A^7, that the cock can be made to admit kerosene and petrol simultaneously to the needle-valve, as well as to admit either fuel alone.

Petrol is used when starting the engine because, as we have already explained, it is difficult on any but very small engines to obtain a sufficient speed by hand to pulverise the kerosene sufficiently. To start the engine, therefore, when it is cold, the two-way cock is placed in that position in which petrol only can find its way to the needle-valve. Immediately the engine has attained its normal speed the two-way cock is turned round through the various positions in which an increasing proportion of kerosene becomes mixed with the petrol until, finally, it is left in that position in which kerosene alone is being fed through it. By this arangement the flow of fuel to the engine is uninterrupted, even momentarily, when switching over from one fuel to the other, and since the two tanks are arranged at the same level as one another there is no tendency for the different fuels to become mixed in either tank at such times.

The needle-valve, A^4, is screwed down into the top of the casting, A, and its point lies inside the nozzle, A^1, where it regulates the quantity of fuel that can pass to the engine. This valve is permanently adjusted to suit the kind of oil that is being used, and does not normally require any attention from the driver of the car. It is of the very greatest importance that the flow of fuel should remain constant at all times for similar working conditions of the engine, and, therefore, a specially constructed supply-tank has been devised by Mr. Sutton, by which the head of oil on the gravity feed remains the same whether the tank is full or whether it is nearly empty. The tank is a very interesting and important feature of the Sutton system, and its ingenious construction will be readily understood from the diagrammatic sketch given in Fig. 5. The pipe, G, at the bottom of the tank, is that through which the oil is led to the engine, and the passage of the oil to it is controlled by a needle-valve, G^2, the spindle of which is carried through a stuffing box in the top of the tank. The needle-valve, G^2, is subject to the control of the driver, but is not needed as a compensation for differences in the level of the oil in the tank. The required compensating action for this is obtained by fitting an air-pipe, G^1, down through the top of the tank, so that it nearly reaches the bottom. Except for this pipe, G^1, the tank is air-tight, and, therefore, when fuel is drawn out from it, it is necessary that the air which takes its place should enter through the pipe, G^1. The result is that no air enters immediately after the tank has been refilled until enough oil has been drawn off to form a sufficient degree of vacuum in the tank to cause the level of the oil in the air-pipe, G^1, to fall to the bottom of that pipe. When further oil is drawn from the tank, air is able to take its place by bubbling up through the fuel outside the pipe, G^1. By this arrangement the actual *effective* level of the oil in the tank is the same at all times, the " head " in the tank being that denoted by the dimension marked, *h*, in our diagram.

A	Needle-valve fitting.	C^1	Anti-drip cone.
A^1	Conical nozzle.	D	Conical sleeve.
A^2	Spray hole in nozzle.	E	Inlet-valve.
A^3	Hole for plug-cock.	E^1	Valve-spindle.
A^4	Adjustable needle-valve.	E^2	Variable lift-lever.
A^5	Fuel-pipe connections.	F	Ignition-plug.
A^6	Two-way plug-cock.	F^1	Inspection-cover for valve
B	Air holes.	G	Feed-pipe from tank.
B^1	Intermediate casting.	G^1	Air-vent pipe to tank.
B^2	Air-regulating ring.	G^2	Needle-valve.
C	Wire gauze.	*h*	Effective head of oil

Table of Reference Letters for the Sutton Engine Illustrations.

The conical nozzle, A^1, projects down into the mixing chamber, and there is a row of holes, B, arranged through the side of the chamber, around the upper end of the nozzle; the whole of the air that is drawn into the engine cylinder enters through these holes. In Fig. 1, the upper portion of the mixing chamber is formed by a separate casting, B^1, but in Figs. 2 and 3 the whole of the mixing chamber is formed in the main casting. Beneath the nozzle, A^1, are several layers of gauze, C, placed close up against one another and lying so as to form a partition across the mixing chamber. On the underside of the gauze partition is a small metal cone, C^1, which prevents any unsprayed oil from forming into drops and so dripping down unatomised below; any oil that might do so, however, would flow out through the drain-hole. Just beneath the gauze partition, the mixing chamber is given a conical shape either by the introduction of a separate sleeve, D (as in Fig, 1), or by suitably shaping the inner wall of the main casting (as in Fig. 4).

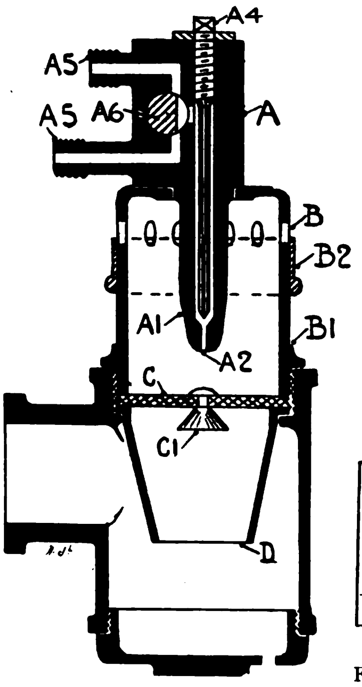


FIG. 4.—Cross-Section of the Sutton Pulveriser.

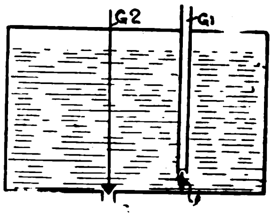


FIG 5.—Diagrammatic sketch showing the arrangement of the Sutton "Constant-Head" Fuel Tank.

It has been found that the exact shapes of the nozzle, A^1, of the cone, C^1, and of the conical sleeve, D, are of all importance to ensure the proper working of the apparatus, and that the exact positions of these parts in relationship to one another, and to the air holes, B, must also be most carefully arranged. Provision, too, has to be made for varying the amount of air that enters the mixing chamber, and the sliding ring, B^2, is fitted for this purpose. The holes need to be almost closed when first starting the engine, apparently in order to give the entering air a sufficiently high velocity to enable it to pulverise the kerosene.

When the apparatus is in use, the oil finds its way through the small central hole, A^2, in the bottom of the nozzle, A^1, and would flow in a small stream on to the gauze partition, C, were it not taken up by the entering air. The gauze apparently does act as an accumulator, or equaliser, by holding in suspension the oil that flows on to it between the suction strokes of the engine, but the actual flow through the nozzle is quicker during the suction strokes than between them, because of the partial vacuum which there then is around the nozzle. The air sweeps round the nozzle at a very high speed, takes up the oil, and, dashing it through the gauze, splits it up into a finely divided spray, which is carried with it through the conical sleeve, D, and the inlet-valve into the working cylinder; the sleeve, D, which has a larger internal diameter at its upper end than at its base, is found to be essential for ensuring sufficient velocity for this purpose.

The parts which we have just described are those which are essential to the Sutton system, and it will be realised that in themselves they are remarkably simple. The difficulty, however, will be experienced of comprehending quite why it is that so extraordinarily effective an atomising effect should be obtained with them, or why—if they do give this effect—there should have been any difficulty in designing such an apparatus for this purpose before. This is just one of those points in connection with which it is difficult to give a satisfactory explanation, but it is a recognised fact that extremely small differences in the shapes and positions of any such parts as these are apt to make all the difference in the working of an atomiser, and to convert comparative success into absolute failure.

The mechanism shown in Figs. 2 and 3 has the induction valve, E, arranged in such a way that the strength of the spring tending to close it, and also the extent to which it can open, are variable. For this purpose the bell-crank lever, E^2, is arranged to engage with the spring, and its other end is connected with a hand-lever for operation by the driver. The valve-spring rests at its upper end against the lever, E^2, and the valve-stem, E^1, passes freely through a slot in the lever.

An ordinary high-tension system of ignition can be used in conjunction with engines fitted with the Sutton kerosene arrangement, and we are assured that practically no carbon is formed anywhere in the engine nor across the inside of the ignition-plug. It will be noticed in Figs. 2 and 3 that an ignition-plug, F, of the usual form, is fitted into the inspection-cover, F^1, that lies immediately above the induction-valve, E. It is, perhaps, not surprising that there should be an absence of carbon deposits in the cylinder, or of visible and smelling vapours in the exhaust, considering that the fuel consumption per horse-power is as low as it appears to be, for in order to be able to obtain as much power as this from the fuel, it is obvious that very complete combustion must be obtained.

The real difficulty is of course to obtain equally complete combustion when the engine is running light as when it is working on full load, and this is where it remains to be seen how far Mr. Sutton has practically overcome previous difficulties. He regulates the power of the engine by varying the volume of the explosive charge that is drawn into the working cylinder, and to a great extent he controls the speed by varying the time of ignition. By the former control, when the lift of the inlet-valve is reduced, the quantity of air drawn through the pulveriser is less, and the suction effect on the spray nozzle is also reduced. It does not however appear to follow that the richness of the mixture would remain constant either under these conditions or with varying engine speeds, because the fuel is at all times free to flow through the nozzle and to continue to do so—though probably at a slower rate—between the suction strokes. It might therefore be expected that a richer mixture would be formed both with reduced load and with reduced speed, and it is obvious also that on the lighter load the degree of compression to which the explosive mixture is subjected prior to ignition would be materially decreased—this too, would have an effect upon the efficiency of the engine and upon the completeness of combustion of the fuel.

The Sutton system has been tested upon engines of different kinds and of different sizes in Australia, and has also been adapted to some existing petrol cars and motor cycles, as well as upon Mr. Sutton's experimental vehicle, of which we gave an illustrated description on January 10th last year. In these cases, however, the engines have so far been of the single-cylinder type, though apparently there is no reason why the same apparatus should not be used for feeding two or even four cylinders on the same engine. It is, in fact, conceivable that the apparatus would be even more satisfactory when working with the practically continuous suction that is afforded by a four-cylinder engine, because then the gauze partition would not be called upon to act as an accumulator or sponge.

One of the converted cars to which we have just referred is shown in the illustration that heads this article, this being a 10-h.p. Winton car belonging to Dr. Merrill, who is vice-president of the Automobile Club of Victoria. Dr. Merrill is at the present time paying a visit to this country, and we learn from him that his car was considerably improved when altered by Mr. Sutton, and that using ordinary lamp oil it has given him every satisfaction; he assures us that it runs without those objectionable features which are usually associated with the employment of that fuel.

IN the middle of April last we published the whole of the identification letters for Great Britain, arranged alphabetically under the registration letters. Simple as this may appear, it received a considerable amount of attention, and we are glad to see that it has further "caught on," as in several directions the arrangement has been so appreciated that it has been re-published in card form suitable for the pocket.

OVER 150 Oldsmobiles have already been sold by Messrs. Charles Jarrott and Letts, Limited, during the present year. Purchasers of these little vehicles are drawn from every class of society, and amongst those who have recently obtained cars of this make are the Right Hon. James Lowther, M.P., Sir Charles Hamilton, Lord Algernon Percy, General Sprot, and Captain Fletcher.

AERONAUTICS.

M. Santos-Dumont's No. 7 has been a long time under construction. A great portion of it, including the gas-vessel, was finished at the commencement of 1903, and since then it has been stored in what he calls his airship station at Neuilly St. James, near Longchamps. This is the racing airship with which he intends to compete at the Aeronautic Competition in St. Louis, and it is interesting to know that it made its first *sortie* from the airship shed on Wednesday in last week, equipped with the motor which it is finally to carry. In regard to the motor, by the way, there has been a change of intention, as it was M. Santos-Dumont's original purpose to equip his racer, No. 7, with a Clément motor, but he has now altered this intention, and the present airship is equipped with a Charron-Girardot and Voigt motor of the same power (60-h.p.). A considerable crowd had collected in the neighbourhood of the airship station, and inside its boundaries were many leading aeronautic experts, all having been attracted by the intelligence that M. Santos-Dumont was going to make an actual trial with his St. Louis racer. As a matter of fact he only desired to test the motor, though had the weather been more propitious he would very likely have put back and made the necessary adjustments for an extended rehearsal. But the afternoon was extremely rainy, and though it cleared up at about 5 o'clock, even when the airship emerged a fine rain was still falling, which naturally increased the weight of the envelope, and would have interfered with any prospects of making an exhaustive test, had not the proceedings been brought to a conclusion by a slight accident to the water tank, which had the effect of allowing the cooling water to escape and the motor in consequence to get too hot. The new motor, however, operated most satisfactorily, and when the further adjustments for completing the steering mechanism are completed, M. Dumont will no doubt attempt extended flight prior to packing his balloon for transmission to America. The short flight actually made on Wednesday showed that the stability of the airship was apparently all that could be desired.

Our readers will remember that the general outlines of No. 7 are similar to those of No. 6, with which M. Dumont won the Deutsch prize, but its actual dimensions are considerably enlarged. The capacity of the gas-vessel is 1,500 cubic metres as against the 622 cubic metres of No. 6, its length being 150 feet, and the greatest diameter 23 feet. The strength of the material of the envelope is also much greater, the envelope being made of French silk four times varnished, and capable of withstanding under dynamometric test a traction of 3,000 kilogs. to the linear metre. The reason of this extra strength is that the pressure inside the gas-vessel has to be very much more than that which was employed in No. 6, owing to the increased speed which it is intended to attain. The gas pressure in the envelope will be approximately four times what it was in the former airship, and is equivalent to a pressure of 12 centimetres of water, the gas valves, in fact, only opening at that pressure. M. Dumont hopes with his 60-h.p. motor to be able to attain a speed of 50 miles an hour with his No. 7.

Although the general construction of the airship is similar to that of No. 6, the propellers are considerably larger, being 5 metres, or 16½ feet, in diameter, and when the airship emerged from the shed on Wednesday, the keel, carrying the motor and propellers, was slung very close under the airship—in fact, there was only some 2 metres between the motor and the bottom of the envelope. This is thought to be rather dangerous, and it is understood that the distance between the two will be considerably increased in future.

M. Santos-Dumont will cross probably to America in the same vessel (the "Kaiser Wilhelm II") with his airship, on June 1st, which is to be packed in seven separate packages to take part in the St. Louis competition. In regard to this competition, a very sensible alteration has recently been made in the rules; that is to say, the prizes awarded to the competing airships are to be in proportion to the actual speed attained. Thus, $100,000 will be given to those attaining a speed of 20 m.p.h. or upwards, $75,000 to those attaining a speed of 18 m.p.h., and $50,000 for a speed of 15 m.p.h.

While these preparations are being made for the Navigable Balloon Competition at St. Louis, Londoners will have an opportunity of seeing experiments on the heavier-than-air-principle conducted in a novel and original way almost at their own doors.

Major Baden-Powell is known to our readers as having for a long time carried on successful and highly valuable experiments with kites for military purposes, and we have referred to his rather sensational experiences with a kite or aeroplane with which he endeavoured to rise in the air, the motive power being provided by a cord attached to a rider on a galloping horse. In fact, he and Mr. Cody are specialists in this particular line, and have done almost equally original and daring work. Major Baden-Powell is a devotee of the heavier than air school, but he apparently differs from most of the chief experimenters in this direction in regard to the best methods of attaining the data necessary for learning how an aeroplane should be balanced. Hitherto the most successful attempts have been made by gliding down a hill in the teeth of the wind. Major Baden-Powell proposes to tackle the question in a different way.

A kind of glorified water-chute is being constructed by the Crystal Palace Company, on one of their big lakes, for his use. It is by running down this water-chute, which is specially designed, that Major Baden-Powell proposes to obtain the velocity through the air required for raising an aeroplane in the first instance, while when it is once "off" he will then be soaring over the surface of the water, and when the impulse fails, or should anything tend to cause a fall, he will have the water to come down into. This, he considers, will be much less dangerous than gliding experiments over *terra firma*.

The water-chute is specially constructed. The greater portion of it has a fall of 1 in 2, and the starting platform at the top is some 30 feet above the level of the lake. The chute as it approaches the water, instead of going down into it as straight as an ordinary water-chute, turns up slightly till an upward incline of 1 in 10 is reached. This will, of course, give the aeroplane a lift as it leaves the track.

The aeroplane itself is to take the form of a small, light, flat-bottomed boat, 20 ft. long and 2 ft. 6 in. deep, on either side of which large rectangular aeroplanes or wings are extended, each 12 ft. by 5 ft. 6 in., the total lifting area of the aeroplane being 132 square feet. Wooden runners project from the boat to slide on the rails, the runners being arranged both above and below the rails, which are well greased and lubricated to reduce friction. The object in having a runner underneath the rails is to prevent sudden gusts of wind lifting the machine off the rails before it has got to the bottom of the track.

Major Baden-Powell will be thus making with his machine a series of flying leaps over the surface of the water, and hopes to be able to amass considerable experience in this way concerning the management of aeroplanes when actually in the air. It will be of interest to discover to what extent his contention that the centre of pressure on aeroplanes tends to move forward, as their velocity through the air increases, is confirmed by his experiments.

There can be little doubt that when Major Baden-Powell's campaign is in full progress it will attract a considerable amount of interest, and that the desire to witness the flights will lead to a largely increased number of visitors finding their way to the Crystal Palace grounds during the summer months.

TYRES IN THE GORDON-BENNETT ELIMINATING TRIALS.

Referring to various statements which have appeared in the Press in regard to the tyres with which the competing cars in the Eliminating Trials in the Isle of Man were fitted, the secretary of the Dunlop Company writes as follows:—

"This letter is not written with the object of entering into any argument, but simply to state the following facts, which we ask you to publish in the interests of truth and fair play.

Mr. J. W. Stocks went completely through the Trials without any trouble whatever to his Dunlop tyres.

Lieut.-Colonel Mark Mayhew had no trouble whatever with his tyres up to the time he retired through a spring breaking.

The fastest trips around the course were made by Messrs. Jarrott and Girling on Dunlop tyres.

The fastest time in the hill-climb was made by Mr. Edge on Dunlop tyres.

The fastest kilometre was made by Mr. Edge on Dunlop tyres.

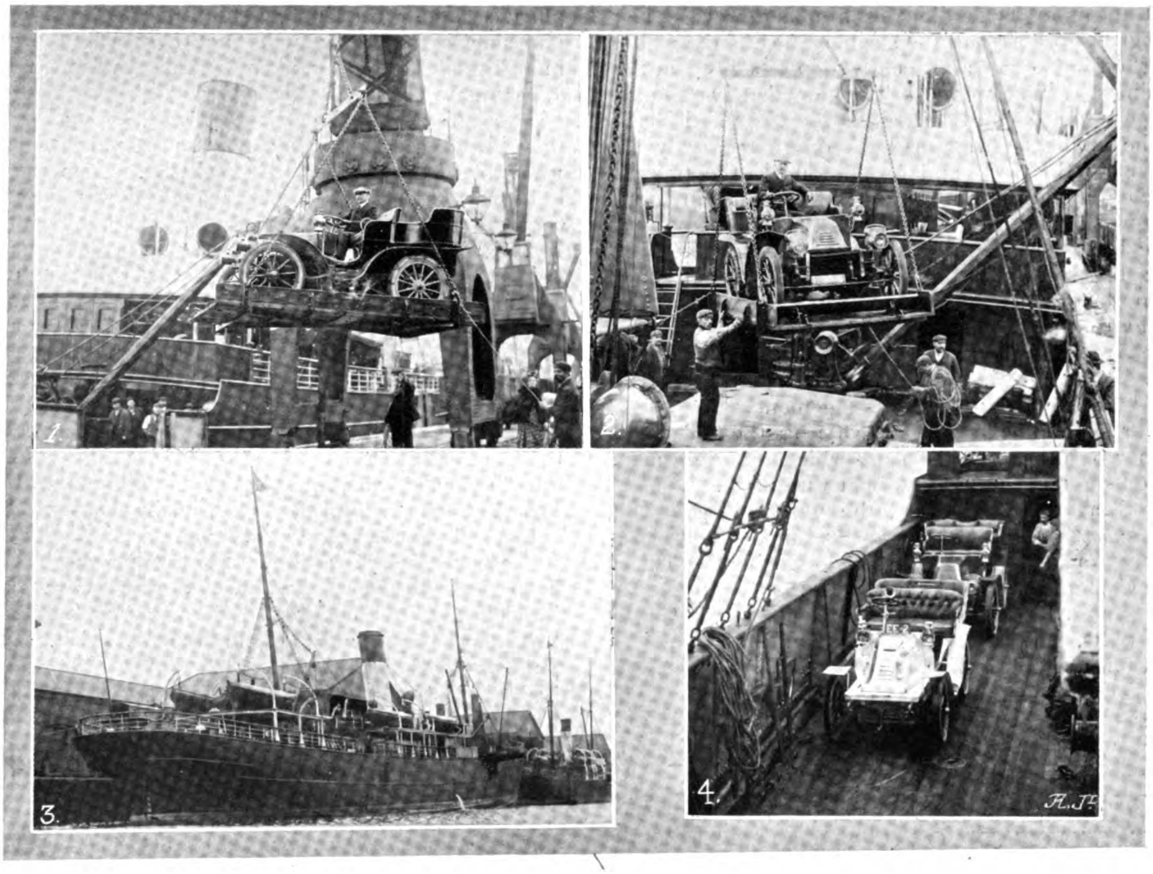
All five cars selected by the Automobile Club for the Gordon-Bennett Race *were fitted with Dunlop Tyres.*

Not one Dunlop Tyre burst.

It will no doubt be fresh in the recollection of your readers, that after last year's Gordon-Bennett Race, statements were published wide-cast to the effect that Mr. Edge failed to win the Cup because of defective tyres. On the 26th of May, 1904, Mr. Harvey Du Cros, jun., in the presence of representatives of the Press and other parties interested, successfully accomplished the ascent of Snowdon, on an Ariel motor car fitted *with the identical Dunlop Tyres* used by Mr. Edge in the Gordon-Bennett Race of last year. Mr. Harvey Du Cros used these tyres at our request, and during the very severe test to which they were put by this unique performance, they gave absolutely no trouble whatever, and are to-day in splendid condition, and can be inspected by anyone interested at the offices of this Company, 14 Regent Street, London. These tyres have never been touched since they were removed from Mr. Edge's car last year.

THE GORDON-BENNETT RACE AND A NEW WAY TO GET THERE.

A VERY large number of motorists must at the present time be making their arrangements for going over to Germany to see the Gordon-Bennett Race, which takes place at Homburg on June 17th. A proportion of these will probably take their cars with them, so the question of how both they and their cars may be most conveniently shipped across the intervening stretch of water is a very important one. There is no doubt that, to the more leisured classes who will form the majority of those going over, time is of less importance than comfort, and many would be willing to go a few miles out of the more direct route if by so doing they would ensure greater convenience for themselves and considerate treatment for their cars. Few people in the south ever think of going as far north as Grimsby in order to sail for the Continent, and it was therefore with considerable interest that we accepted a recent invitation to inspect the special arrangements which the Great Central Railway Company have completed at their Grimsby Docks for the shipping of cars to Hamburg, Rotterdam, or Antwerp. The Great Central route is, of course, one which would naturally suggest itself to inhabitants of the Midlands and Northern Counties as being one of the most direct, but now that the Company has made such complete arrangements for the safe and proper handling of cars, many of those who live further south might well be attracted in that direction also.



SHIPPING CARS FOR THE GORDON-BENNETT RACE.—In the above illustrations, the method adopted by the Great Central Railway Company for getting cars on board their boats is shown. In the top left-hand photograph, the car is being hoisted up in the cradle, prior to being swung on board, and in the right-hand view, the cradle is being guided to a suitable position on the deck. As will be noticed, the motorist can if he desires be "shipped" at the same time, the motorist in the above photograph being Mr. F. Barwick, Portmaster of Grimsby Docks. In the lower view to the right, two cars are seen in position on deck, while the left-hand photograph shows the ss. "City of Leeds," one of the Company's finest boats, which will be specially used for this work in June.

Although the Great Central Railway have made arrangements for the through booking of cars from any of their interior stations, which will enable motorists to have their cars delivered in Homburg, the majority of motorists will, of course, prefer to drive their cars to and from the ports, and it is these that the Great Central Railway are specially catering for. Of their large and well-equipped service of cross-channel steamships, their two largest and newest boats, the *City of Leeds* and the *City of Bradford*, are to be put on special service in time for making the crossing in connection with the Gordon-Bennett Race. These sister ships have a tonnage of 1,400 tons, and are exceedingly well appointed in every way, so that saloon passengers can be certain of finding every comfort during their passage from Grimsby Docks to Antwerp or Rotterdam, as the case may be. The boats are admirably adapted for carrying safely a large number of motor cars—as many as twenty to twenty-five at a time. Consequently, motorists will be put to no inconvenience by having to wait for their cars on the other side, but can travel with them on the same boat.

The arrangements for getting the cars safely on board are excellent and show a consideration for the car which is, even at the present day, not shown to the horse in many ports. Both car and motorist can be shipped in "one piece" if the motorist should be unwilling to trust the car out of his own hands, but this "ordeal" is by no means a *sine qua non*, and no doubt the majority will prefer not to share the distinction of such an "elevated," albeit safe, way on board as that depicted in two of our accompanying illustrations. The process of getting the cars on board is very safe, very quick, and very simple; the motorist is permitted to drive his car right down to the quay-side where it is run on to a "cradle," which waits in readiness, attached to a crane. Adjustable "chocks" are pushed up under the wheels and with one turn of the nut they are clamped fast in position and secure the cars in its cradle "as firm as a rock." The word is given to hoist and the steam crane lifts the cradle and car off the quay and gently deposits both in the boat alongside. The "chocks" are immediately removed and the car run off and lashed in its appointed place while the cradle is swinging back on to the quay for another car. So rapid and expeditious is the process that the car is transferred from quay to steamer in about 1½ minutes; and so careful is the company that not the least harm shall be done to the cars, that nothing but soft cotton rope is used for lashing the cars on board—a consideration on the part of the Company to the motorist's car which will perhaps be better appreciated by those who know the relative cost of rope. Of course, no petrol may be carried on the car during the passage, but arrangements have been made for syphoning off the petrol from the tanks and sealing it up in the ordinary cans which motorists may, if they desire, take over in the boat with them.

Arrived at the other side, the motorist again has the same attention as at Grimsby, and similar conveniences for dealing with cars are available there also. All the Customs formalities will be attended to by the Great Central Railway Company's agents at the Continental ports, and every assistance and all possible information will be afforded to the passengers both there and also at Homburg and Frankfort. For those who do not intend to drive their cars immediately after landing on the other side, but wish them sent on to Homburg, there are the special through rates we previously mentioned by which the cars will be forwarded by "Grande-vitesse" goods train, as the Belgian and Dutch railways do not allow cars on passenger trains.

One of the most pleasing features in the arrangements at Grimsby Docks is the enthusiasm of the officials who have instigated and carried them out. Mr. Barwick, the portmaster, by whose courtesy we were enabled to take the accompanying photographs, is himself a keen automobilist, and his interest in automobilism is fully reflected by all the other officials, who are very anxious that the motorist and his car shall both be properly treated. Such favourable feeling on the part of the officials should in itself have no little weight with those choosing a route, for it is not everywhere that the motorist-cum-car is a welcome guest even though he be a paying one.

Those motorists who arrive at Grimsby Docks before they wish to sail, and who stay at the Royal Hotel there, which besides belonging to the G.C.R. is also the local headquarters of the Automobile Club, will have their cars "garaged" free of charge. The hotel manager, Mr. Spencer, another enthusiast in automobilism, is going to personally attend to the transfer of such cars to the boat, and is as anxious as the other officials to give those motorists who are crossing over by that route as little trouble and anxiety as possible.

For particulars of through rates from interior stations on the Great Central Railway, intending passengers should inquire of Mr. R. Haig Brown, Superintendent of the Line, Manchester. For all information respecting the Channel service, motorists should communicate with Mr. F. Barwick, Portmaster, Grimsby Docks. British automobilists entering Germany are reminded that they will be saved much trouble at the frontier and elsewhere if their cars are adorned with one of the "G.B." badges, which have been issued by the German Automobile Club, and may be obtained from the A.C.G.B.I. up to June 10th.

RACES, RECORDS, AND TRIALS.

GORDON-BENNETT ITEMS.

THE SELECTION OF GORDON-BENNETT DRIVERS FOR GREAT BRITAIN.

SIR,—I enclose you copy of letter sent to the Secretary of the Automobile Club to-day, which clearly sets out the position in regard to Mr. Clifford Earp, and also my own wish in regard to the matter.

It cannot be too clearly understood that if Great Britain requires three Napier cars to represent it in Germany they will be forthcoming with suitable drivers.

You will, of course, quite appreciate the fact that I have been driven, much against my personal inclination, to ask to be relieved from representing England in the forthcoming contest.

My firm has made considerable sacrifices, in regard to money, to produce the finest cars available, and outside this, it is naturally a great personal disappointment to me to think that there will be a Gordon-Bennett Race in which I shall not make one of the team, more especially, as in the three previous years I have been the sole British surviving representative.

I am afraid that possibly, in this case, I have allowed my sporting views of matters to outweigh business considerations, but I cannot stand on one side and see the admittedly second best combination in the trials, in the person of Mr. Clifford Earp with his Napier car, excluded.

Yours truly,
S. F. EDGE.

(ENCLOSURE.)

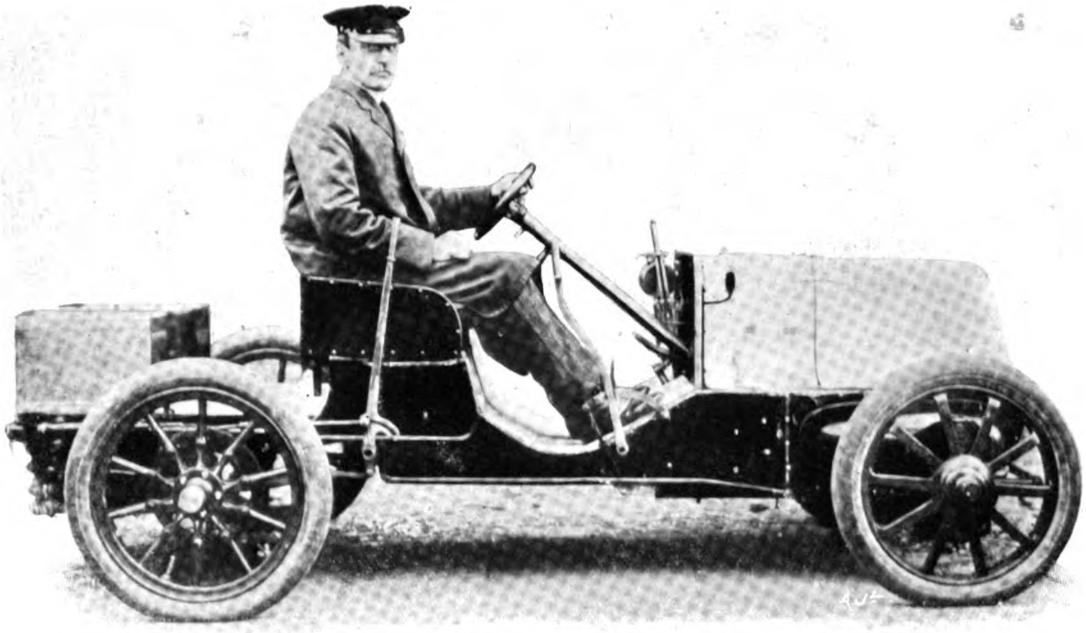
The Secretary,
Automobile Club.

DEAR SIR,—I have your letter stating that your Committee do not propose to alter their decision in regard to Mr. Clifford Earp, and that your Committee still propose to adhere to their decision to prevent the second best car and driver from representing Great Britain in the coming Gordon-Bennett Race.

I would like to point out to your Committee a few facts which seem inconsistent with their decision.

Firstly, at a special meeting of the Races Committee, held on May 3rd, it was arranged and stated in the *Club Journal* that the final selection of cars and drivers to represent us in Germany could not be done prior to the return of the Races Committee to London; in the face of this resolution a meeting was held in Douglas, without the full number of your Committee being present, and a decision come to within a few minutes of the accident, apparently acting on the assumption that neither Mr. Earp nor his car would be fit to represent Great Britain in Germany on June 17th.

As it has now been publicly demonstrated that both Mr. Earp and his car are, if anything, a shade better than when they were running in the Isle of Man, by his driving his car some 250 miles to take part in the Nottingham Automobile Hill Climb, in which competition he finished 4⅘ secs. behind my Isle of Man car, and 2⅖ secs. only behind Col. Mayhew's car, it seems to me to be demonstrated, out of question of doubt, that both he and his car are in perfect



Walter Christie in his American-built Racer. Christie failed to reach the trial track owing to faulty carburettor. The peculiarity of the Christie Racer is that the 4-cylinder engine lies transversely across the frame in front, and that the power is transmitted from it direct to the front (steering) wheels; the upper portion of the engine is seen in our other illustration.

condition. I accompanied him over the whole of the drive myself, and am satisfied that your Committee's decision is against the best interests of Automobilism.

As a record of my sporting disapproval of a decision given in contradiction to actual proved results, I would prefer that your Committee would relieve me of the honour of representing the English Club in the International Gordon-Bennett Race.

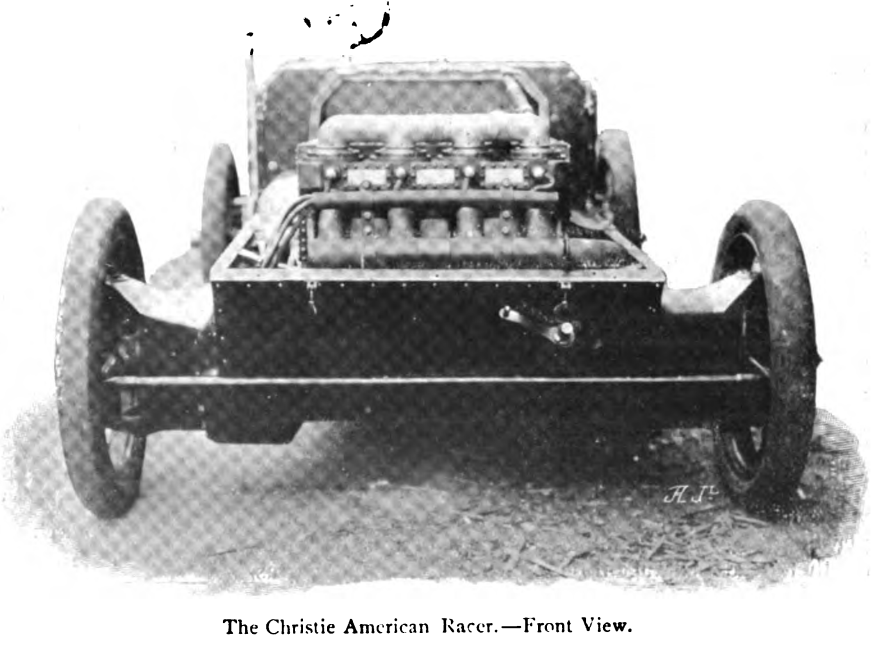
At the same time I would like you to point out to your Committee that at least three suitable Napier cars will be kept ready at the disposal of the Automobile Club, in case the competitors at present chosen to represent the Club may be unable to run on June 17. I beg to point out to your Committee that although there have been many claimants for the honour of representing this country in the Gordon-Bennett Race, so far Napier cars have been the only ones which have been fit to run the day of the race, and history may repeat itself.

May 30th. S. F. EDGE.

The "Pipe" cars, of which one is shown in our frontispiece, do not differ materially in construction from the well-known touring cars built by this company; they are of the chain-driven type, have armoured-wood main frames, and are fitted with the "Goliath" magnetic clutch invented by Mons. Jenatzy. The 4-cylinder engines are of 90-h.p., the valves are all mechanically operated, and a high-tension system of ignition with accumulators is adopted on them. The maker's "automatic" type of carburettor is employed, the change-speed-gear provides four forward speeds and a reverse, and there are two brakes on the differential countershaft as well as the internal expanding brakes on the hubs of the rear wheels. "Continental" tyres are being fitted, and the English agents—the London Motor Garage Company—inform us that these cars are confidently expected to give a good account of themselves in the race.

As already anticipated, it has now been officially announced that the German Automobile Club have selected for their third representative in the race an Opel-Darracq car. This will be driven by Fritz Opel.

THE Belgian National Circuit, which should have commenced on Monday last, was at the last moment postponed until a later date, not yet decided upon.



The Christie American Racer.—Front View.

ARRAS AUTOMOBILE WEEK.—The starting point from which the Hill Climbing event took place.

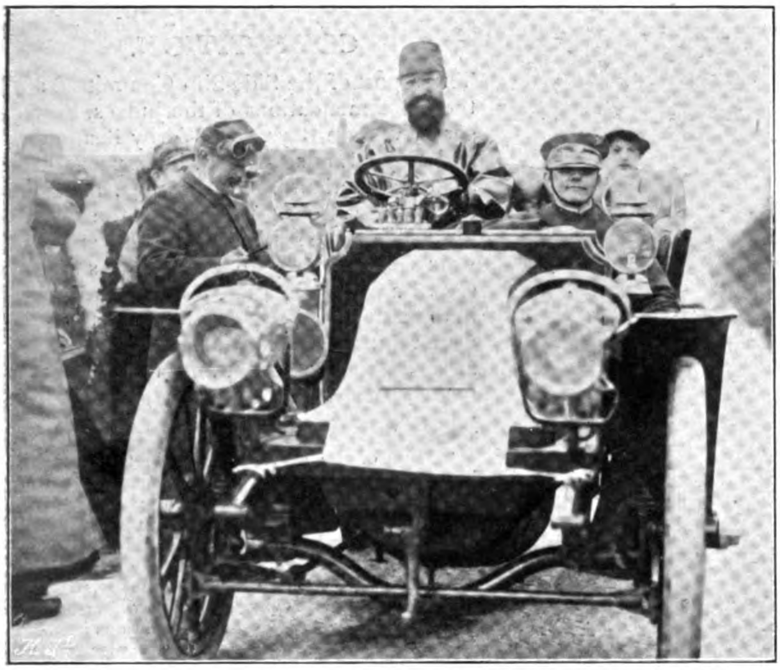
Arras Automobile Week.—Although the leading crack racers were absent from this series of events, which commenced on Wednesday of last week with speed trials over the standing mile and flying kilometre the "crowd" were afforded plenty of good sport, and several new world's records were established in the minor categories outside the "giants." Baron de Caters, who so recently put up the fastest time on his Mercedes racer that has ever been accomplished in the world, of 23 secs. for the flying kilometre, equal to the prodigious speed of over 97 miles per hour, found it impossible to be present with his car. He had been called away to Cannstatt to sample the Taunus course with Jenatzy.

The new records on the first day curiously fell to the credit of all the three competitors in the light car class—Beconnais and Baras, who tied, both driving Darracqs, succeeded in covering the standing mile in 1 min. ⅕ sec., a speed of 59·8 miles per hour, whilst the third man, Hanriot, on a Bayard-Clement, although 4 secs. behind the two Darracq cars for the standing mile, secured a record for the flying kilom. for this class with the time of 28⅕ secs. (79·32 miles per hour), beating the times of Beconnais and Baras by 2 secs. and 3⅕ secs. respectively. All three men were driving last year's cars. In the Tourist Section the new 2-cylinder De Dion-Bouton car made the fine running for the mile of 2 mins., and the kilom. 1 min. 5 secs. The point chosen for the races was on the road between Gravelle village and Fresnes-les-Montauban.

The chief results are annexed, the classing being determined by adding together the times for the standing mile and the flying kilometre.

The second day the contest was over 5 kiloms. (standing start), the rendezvous being at Beaumetz les Loges, about 17 kiloms. from Arras. Gabriel, on his De Dietrich car, accomplished the best time of the day, viz., 2 min. 36⅗ sec., giving a speed of about 120 kiloms. per hour. A remarkable coincidence of this day was another dead heat, again between Béconnais and Barras

	Results for First Day.	Standing Mile.	Flying Kilo-metre.	Total.
	Racers.			
	MOTOR CYCLES.			
		m. s.	s.	m. s.
1	Anzani (Alcyon)	1 7⅖	36⅕	1 43⅗
2	Demester (Griffon)	1 9⅘	35⅘	1 45⅗
3	Lamberjack (Griffon)	1 21⅘	36⅗	1 58⅖
	MOTOR CYCLES (over 50 kiloms.).			
1	Rigal (Buchet)	1 15⅘	37	1 52⅘
	VOITURETTES.			
1	Villemain (Darracq)	1 8⅖	34⅘	1 43⅕
	LIGHT CARS.			
1	Béconnais (Darracq)	1 0⅕	30⅕	1 30⅖
2	Baras (Darracq)	1 0⅕	31⅖	1 31⅗
3	Hanriot (Bayard)...	1 4⅕	28⅕	1 32⅖
	CARS.			
1	Wagner (Darracq)	1 2⅖	28⅗	1 31
2	Clément (Bayard)	1 1⅖	31⅖	1 32⅘
	Gabriel (De Dietrich)	1 2⅗	30⅕	1 32⅖
4	Pelser (Serpollet)...	1 11	34⅖	1 45⅖
5	Chanliaud (Serpollet)	1 11⅖	36⅘	1 48⅕
6	Le Blon (Serpollet)	1 17		
	Tourists.			
	SECOND CATEGORY (*2-cylinder cars*).			
1	Delmasure (12-h.p. De Dion) ...	2	1 5	3 5
	THIRD CATEGORY (4 *cylinders* 12 *to* 20-*h.p.*).			
1	Dreye (20-h.p. Serpollet) ...	1 30⅖	42⅘	2 13⅕
2	Declercq (19-h.p. Mors)	1 37⅘	47⅘	2 25⅗
3	Baras (15-h.p. Darracq)	1 40⅖	52⅗	2 33
4	Deville (20-h.p. Serpollet) ...	1 52	44⅗	2 36⅗
5	Franchomme (14-h.p. Renault)...	1 50	53⅗	2 43⅗
6	Huet (18-h.p. Peugeot)	1 54⅗	58⅖	2 53
	FOURTH CATEGORY (4 *cylinders over* 20-*h.p.*).			
1	Wattine (25-h.p. Peugeot)	1 37	45⅗	2 22⅗



ARRAS AUTOMOBILE WEEK.—M. Franchomme, President of the A.C. du Nord, on his car.

on their light Darracq cars, both securing the time of 2 min. 53 sec. for the distance. The chief results were as follows :—

5 KILOMS. (STANDING START).

RACERS.

Motor bicycles under 50 *kilogs.*—1. Griet (Griffon), 3 min. 30⅘ sec. ; 2. Demester (Griffon), 4 min. 2⅘ sec. ; 3. Lamberjack (Griffon) and Anzani (Alcyon), 4 min. 5 sec.

Over 50 *kilogs.*—1. Rigal (Buchet), 3 min. 25⅘ sec.

Voiturettes.—1. Villemain (Darracq), 3 min. 15 sec.

Light cars.—1. Barras (Darracq) and Béconnais (Darracq), 2 min. 53 sec. ; 3. Hanriot (Bayard-Clément), 3 min. 15 sec.

Cars.—1. Gabriel (De Dietrich), 2 min. 36⅘ sec. ; 2. Wagner (Darracq), 2 min. 40⅖ sec. ; 3. Alb. Clément (Bayard-Clément), 2 min. 54⅘ sec. ; 4. Pelser (Serpollet), 2 min. 56⅘ sec. ; 5. Le Blon (Serpollet), 2 min. 57⅖ sec. ; 6. Chanliaud (Serpollet), 3 min. 5⅕ sec.

TOURISTS.

Cars.—1. Deville (Serpollet 20), 3 min. 55⅘ sec.; 2. Dreye (Serpollet 20), 4 min. 12⅕ sec. ; 3. Declerc (Mors 19), 4 min. 18⅕ sec. ; 4. Gabreau (Boyer 14), 4 min. 42 sec. ; 5. Cordonnier (Renault 14), 4 min. 45⅕ sec. ; 6. Simon (Mors 19), 4 min. 48⅕ sec.

The next day, Friday, the third and last of the speed events was run off on Doullens Hill, when the competition was over a standing kilometre on the hill, and in addition the Coupe de Caters was run for over a flying half kilometre on the same hill. During the early morning it was anticipated this event would have to be postponed, but fortunately the downpour of rain ceased about midday, and all was ready in good time to run the race as originally arranged. The gradients on the hill range up to 1 in 8 and 1 in 10, the worst points being towards the finish. Both the standing kilometre and the flying half kilometre for the De Caters Cup were run at the same time, the half kilometre time being taken from the finishing point of the standing kilometre. This concluding competition was successfully carried through, with the exception of a slight accident to Rigal, which prevented him taking part in the race for the De Caters Cup. The principal times for the day were as follows :—

Doullens Hill Climb.—1 kilom. (standing start) and 500 metres (flying start), the latter for the Coupe de Caters.

1 KILOMETRE. RACERS.

Motor bicycles.—1. Lamberjack (Griffon), 50 sec. ; 2. Anzani (Alcyon), 54⅕ sec. ; 3. Demester (Griffon), 1 min. 10⅖ sec.

Voiturettes.—1. Villemain (Darracq), 53⅗ sec.

Light cars.—1. Béconnais (Darracq), 47⅕ sec. ; 2. Hanriot (Bayard-Clément), 52⅘ sec. ; 3. Baras (Darracq), 53 sec.

Cars.—1. Wagner (Darracq), 53⅕ sec. ; 2. Gabriel (De Diétrich), 53⅘ sec. ; 3. Clément (Bayard-Clément), 54⅗ sec. ; 4. Pelser (Serpollet), 1 min. 22 sec.

TOURISTS.

Motor bicycles.—1. Godard (Alcyon), 1 min. 13⅖ sec.

Cars 12-20-*h.p.*—1. Dreye (Serpollet), 1 min. 14⅘ sec. ; 2. Deville (Serpollet), 1 min. 30⅖ sec. ; 3. Baras (Darracq), 1 min. 44 sec. ; 4. Gabreau (Noé Boyer), 1 min. 55⅕ sec. ; 5. Cordonnier (14-h.p. Renault), 1 min. 58⅘ sec. ; 6. Franchomme (14-h.p. Renault), 2 min. 2⅗ sec.

Cars over 20-*h.p.*—1. Wattine (25-h.p. Peugeot), 1 min. 42 sec.

Coupe de Caters (500 *metres on hill*).—1. Hanriot (Bayard-Clément light car), 19 sec. ; 2. Wagner (Darracq car), 19⅕ sec. ; 3. Anzani (Alcyon bicycle), 19⅘ sec. ; 4. Lamberjack (Griffon bicycle), 20⅕ sec. ; 5. Béconnais (Darracq light car), 21⅕ sec. ; 6. Griet (Griffon bicycle), 21⅕ sec. ; 7. Villemain (Darracq voiturette), 22⅖ sec. ; 8. Demester (Griffon bicycle), 25 sec. ; 9. Clément (Bayard car), 28 sec.

ARRAS AUTOMOBILE WEEK.—M. Hanriot, who created a new record for the flying kilometre for light cars.

ARRAS AUTOMOBILE WEEK.—A popular gathering point and participant in the meeting at the Hill Climbing Competition.

For the wind-up of the week a tourist run to Touquet had been organised, starting from Arras over a distance of 200 kiloms. with a control stop at Boulogne, the chief points passed through being Saint-Paul, Hesdin, Fruges, Fauquembergues, Saint-Omer, Colembert, Boulogne, Saint-Léonard, Samer, Montreuil, Etaples. During the day's run the cars were timed over a flying kilometre on the flat just before reaching Saint-Omer, and over a kilometre on the Tingry Hill soon after passing Boulogne. For these two speed tests maximum times had been fixed, and failure to cover either distance within the specified times entailed "non-classing." Of the 28 cars which started from Arras 20 had complied with the conditions on arrival at Touquet. In addition to the general prizes offered to the competitors, a gold medal was added by the King of the Belgians. This was secured by M. Deville with a 20-h.p. Gardner-Serpollet car, Houet (18-h.p. Peugeot) being second, Franchomme (14-h.p. Renault) third, and G. Wattine (25-h.p. Peugeot) fourth.

Altogether, the week's events created an enormously favourable impression, resulting in the determination to repeat the meeting annually.

A propos of the town of Arras, there is an old tag which has come down from past centuries :

"Quand les souris mangeront les rats
Les Français prenderont Arras."

This was written on the walls of the city when the French besieged the Spaniards there in the 16th century. The French took the town and rubbed out the "p" in the inscription, which then read :

"Quand les souris mangeront les rats
Les Français *renderont* Arras."

JULY 15 to 20 has been fixed for the four days motor boat races which are to take place at Ostend during the present season. The dates synchronise with the Ostend automobile week.

THE A.C.G.B.I. SIDE-SLIP COMPETITION.

THE report of the Side-Slip Committee and the recommendations of the judges, Professor C. Vernon Boys, Mr. Worby Beaumont, and Major Lindsay-Lloyd, in respect to the awards, is to hand. The report, after detailing the various tests to which the entered appliances were subjected, full particulars of which have already appeared in this journal (April 23rd, 30th, and May 7th), states that in the actual side-slipping tests all the cars were required to cross a specially prepared greasy patch at speed, and to attempt to make a sharp turn while on the grease. The judges continue their report as follows :—

"None of the cars succeeded in turning in the least degree out of the straight, all making a front wheel side-slip in the direction of the length of the car with the wheels locked hard over, clearly proving the necessity for having both front and back wheels fitted with a non-slipping device to ensure perfect control under extreme conditions. The Vivian device was fixed on all four wheels, but this did not enable the car to turn under the severe conditions imposed. The cars were then run over the greasy patch and the brakes applied suddenly; a considerable variation was apparent in the adhesion of the wheels fitted with the various devices. The cars were then made to start on the greasy patch, and the results agreed with those of the brake test.

Three of the devices under trial were then fitted to the front wheels, and this enabled the cars to make a fairly sharp turn on the grease.

All the tyres, tubes, and devices were then examined for wear, and the results of the examination have been duly taken into consideration in framing the following recommendations.

1. That a prize of £150 and a Gold Medal should be given to M. L'Empereur for his device, No. 12. This device gives good protection against side-slip, is quickly applied and removed ; affords protection to the tyres, and in case of any fracture or disarrangement is easily, cheaply, and quickly repaired.

2. That a second prize of £100 and a Silver Medal be given to the Parsons Non-Skid Company for their device, No. 14. This device gives good protection against side-slip, is easily applied and removed, and is simple and cheap to repair.

3. That a third prize of £50 and a Silver Medal be given to the Civil Service Motor and Cycle Agency for their Billet device, No. 15. This gives good protection against side-slip and to the tyres. The studs, however, require considerable attention and somewhat frequent renewal, and the device when detached is not so conveniently carried on the car.

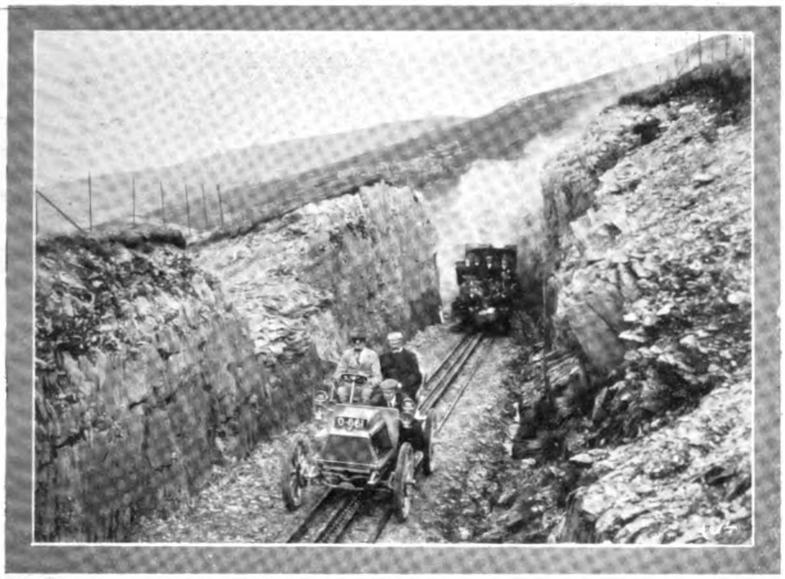
A Silver Medal and a High Commendation be given to the Wilkinson Tyre and Tread Company for their device No. 8, but we find that considerable heat is developed which is liable to cause trouble both with the covers and tubes.

That a Silver Medal, with High Commendation, be given to Mr. Mark Vivian for his device, No. 7. These tyres were in very good condition at the end of the trials, they absorb no more power than an ordinary tyre, and are a fair protection against side-slip.

That a Silver Medal be given to Mr. H. S. H. Cavendish for his device, No. 2, as this proved to be the best of those designed to be operated from the driver's seat, and to effectually prevent side-slipping of the back wheels of the car to which it was fitted.

We are of opinion that all devices which depend for their application on the timely action of the driver, such as Nos. 2, 3, 5, and 6, are subject to the objection that they may not be brought into use quickly enough in emergency, and that they are not easily fitted to all types of cars without special design.

Although we have recommended the award of three money prizes, with medals, and three other medals, we do not consider that any of the devices, as entered for the competition, meet all the requirements. The problem is a difficult one, but more has been done towards its solution by some of the competitors than might have been expected. Much, however, yet remains to be done to remove the difficulties of application, inconvenience, or even danger attending breakage of parts, first cost, cost of renewals, and inconvenience caused by the necessity for frequent renewal of small component parts and the absorption of power."



CLIMBING SNOWDON MOUNTAIN BY MOTOR CAR.—Mr. Harvey Du Cros, Junior, on his Ariel, about one-third of the way up the mountain, coming through the cutting, followed by the Mountain Railway train.

Mr. Harvey Du Cros has conquered Snowdon at last. He made a valiant attempt to drive up it last January, but was stopped by a snowdrift as he approached the summit. What proved impossible, however, in January has turned out to be feasible in May, and on Thursday in last week he successfully planted the banner of the Ariel car on the summit of the mountain. As on the former occasion the car climbed along the railway route, and what an undertaking this was may be gathered from the fact that the average gradient of the line is, we are informed, steeper than that of any other mountain railroad in the world, and over long stretches amounts to as much as 1 in 5. The surface on which the car had to travel still remains very rough and dangerous, and at eight different points planks of wood had to be employed for getting the car across gulleys and crossings. The exploit was one calculated to test the nerves of the driver. On one side the great Pass of Llanberis falls away almost sheer for 1,000 feet from the side of the line, and had the brakes and sprag given way nothing could have saved the adventurers from a fearful accident. However, it is pluck that ultimately succeeds in every venturesome undertaking, and Mr. Harvey Du Cros, jun., may now congratulate himself on having successfully accomplished a most remarkable mountaineering feat on an automobile.

Incidentally its accomplishment provides a testimonial to the reliability and power of the 15-h.p. Ariel car, which that well-built car thoroughly deserves.

The photographs which we reproduce give an impressive notion of the extreme difficulties of the route.

Motor Boat Meet at Meulan.—Last Sunday a series of events organised in the Meulan Dock by the Cercle de la Voile were successfully carried through. In the racing section, the results were as follows:—

8-metre boats (44 *kiloms.*).—1. La Rapee III, 1 hr. 22 mins. 27 secs.; 2. Titan II, 1 hr. 29 mins. 40 secs.

CRUISERS.

Boats under 6½ *metres* (22 *kiloms.*).—1. La Marguerite, 1 hr. 0 mins. 47 secs.; 2. Arion III, 1 hr. 24 mins. 5 secs.; 3. Thelene, 2 hrs. 7 mins. 17 secs.

Boats 6½ *to* 8 *metres* (33 *kiloms.*).—1. Titan III, 1 hr. 28 mins. 59 secs.; 2. Consul, 1 hr. 32 mins. 26 secs.; 3. Allo III, 1 hr. 36 mins. 25 secs.

Boats 8 *to* 12 *metres* (44 *kiloms.*).—1. Vas-Y, 1 hr. 41 mins. 7 secs.; 2. Usona II, 2 hrs. 19 mins. 2 secs.

A.C. of America Commercial Vehicle Trials, April 4-9.—Official awards of medals. A full report is to be issued later:—

Class 1.—To carry 1,000 lbs. or under.—Nos. 7. Olds Motor Works, gold medal; 8. Olds Motor Works, silver medal; 4. Knox Auto. Co., bronze medal.

Class 2*a*.—To carry 1,000 to 2,000 lbs.—Nos. 12.*Pope Co., gold medal; 5. Knox Auto Co., silver medal; 11.*Pope Co., bronze medal.

Class 2*b*.—To carry 1,000 to 2,000 lbs.—Nos. 16.*Cantono Tractor Co., gold medal; 14.*Electric Vehicle Co., silver medal; 2. C. Rockliff, bronze medal.

Class 3.—To carry 2,000 to 3,000 lbs.—Nos. 9. Consolidated Motor Co., gold medal; 6. Knox Auto. Co., silver medal.

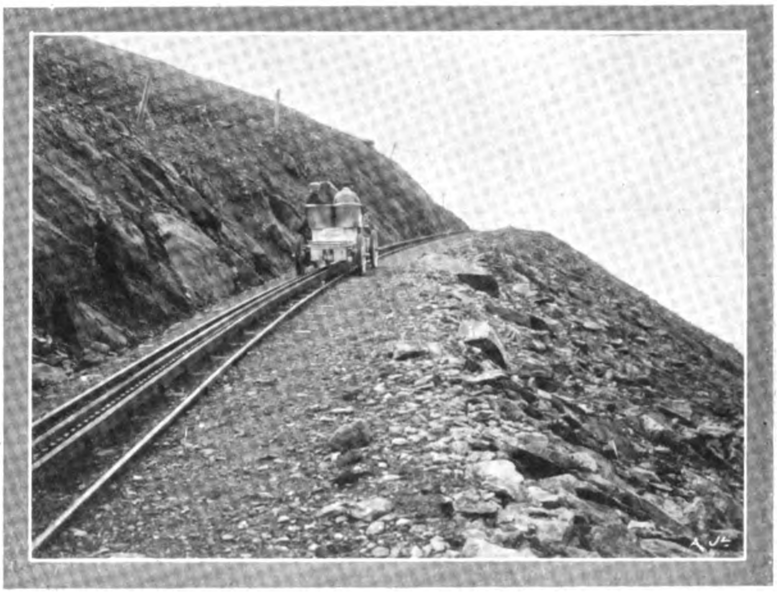
Class 4.—To carry 3,000 to 4,000 lbs.—No. 3. Union Motor Truck Co., gold medal.

Class 5.—To carry 4,000 to 5,000 lbs.—15.*Electric Vehicle Co., gold medal.

Class 8.—To carry 8,000 to 10,000 lbs.—17.†Fischer Motor Vehicle Co., gold medal.

* Electric. † Petrol electric.

Auto-Cycle Club.—A meeting of the trade will be held at 119, Piccadilly on Thursday next, June 9th, at 7.30 p.m. relating to the reliability trials for motor cycles, to (1) elect ten representatives of the trade who will form with the ten representatives of the Auto Cycle Club the Trials Advisory Committee; (2) consider the date of the trials. Manufacturers and agents are invited to attend this meeting.



CLIMBING SNOWDON MOUNTAIN BY MOTOR CAR.—The Ariel Car, stopped on a gradient of 1 in 6 to enable a special photograph to be taken, showing the "perpendicular" Snowdon telegraph posts.

Auto Cycle Club.—The gold medal for the most meritorious performance in the hill-climbing competition, held by this Club, on May 14th, the results of which appeared in our last issue, has been awarded to J. Van Hooydonk, for his Phœnix Trimo (No. 33), in Class 4, with 1,470 marks. The formula used for arriving at the award was—

$$\frac{W}{C \times T} = \text{figure of merit,}$$

where W = weight of machine and rider (652 lbs.), C = volume swept out by piston (551·368), T = time taken to climb the hill (80⅗ secs.).

NEXT Saturday (June 11th), the Catford Cycle Club will hold their annual open hill-climb at Westerham Hill. There will be two classes for motor bicycles, viz.:—

Class 1.—For machines with engines having a cylinder capacity not exceeding 70 × 70, or the equivalent volume swept out.

Class 2.—For machines with engines having a cylinder capacity exceeding 70 × 70 and not exceeding 80 × 80.

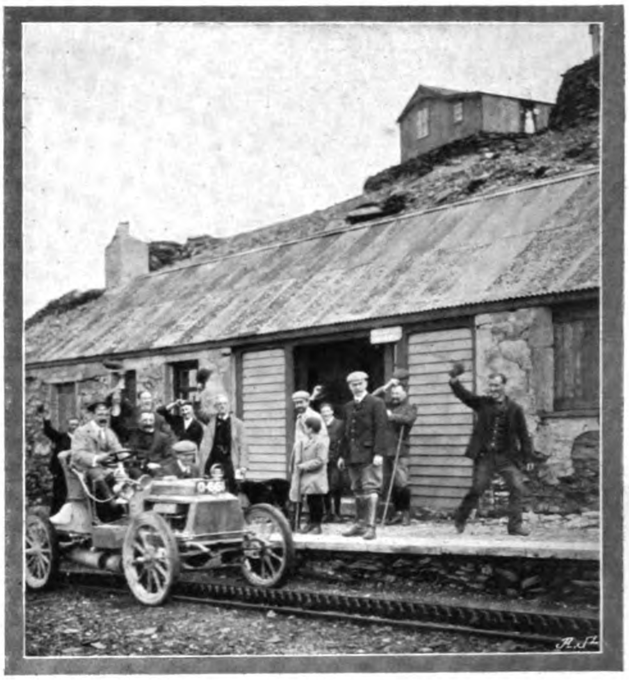
Gold medals will be awarded for the fastest time accomplished in each class, and three prizes will be awarded in a sealed handicap run in conjunction with both classes.

The Lincolnshire Motor-Cycle Reliability Trials.—The second round of the eliminating motor-cycle trials organised by the Peterborough and District Motor Club, took place on Friday, May 27th. The test is a 100 miles non-stop run from Peterborough to Lincoln and back. Originally there were thirteen competitors out of fifteen entries, and the first round reduced these to seven, as follows:—B. C. Holmes (Peterborough), 3½-h.p. Vinco-Minerva; T. Woodman (Peterborough), 2¾-h.p. Bat; H. Brown (Peterborough), 2½-h.p. Bradbury; P. Mays (Bourne), 2¾-h.p. Vinco-Minerva; E. A. C. Sturton (Peterborough), 2½-h.p. Vinco-Minerva; P. R. Heighton (Peterborough), 2¾-h.p. Vinco-Minerva; and B. Gibson (Bourne), 2¾-h.p. Vinco-Minerva. The rules were precisely the same as those of the first round, but the weather conditions were not nearly so favourable as rain fell during a greater part of the journey. Of the seven starters three again completed the non-stop as follows:—Holmes, Woodman, and Brown, and they, consequently, qualified for the third round. Two of the other competitors—Sturton and Mays—had the misfortune to break the belts of their machines, Gibson's ignition failed, and Heighton punctured. In the third round, should more than one competitor be left in the running after completing the 100 miles course as before, a further 50 miles will be run to Folkingham and back, and if necessary—after an hour's interval—a further 25 miles, and so on until the winner is decided. The prizes offered are a handsome silver cup to the winner, gold medal to the second, and a silver medal with gold centre, to the third. The seven competitors who originally completed the non-stop will receive certificates recording their success.

West Surrey Automobile Club.—The results of the annual hill-climbing handicap, held on Saturday last, on the course of 2 miles 1,500 yards, at Hindhead, were as follows:—

		Time.	Handicap.
		m. s.	m. s.
Wilson Noble ..	18–28-h.p. Mercedes ...	6 9	scratch.
J. S. Fletcher ...	20-h.p. Durkopp ...	9 42	1 0
E. E. Pullman ...	15-h.p. Durkopp ...	10 30	1 30
O. O. Wrigley ...	12-h.p. Clement ...	8 43	2 0
A. C. Tessier ...	10–12-h.p. Motobloc ...	10 32	3 0
J. F. Ponsford ...	9-h.p. Clement... ...	9 38	3 45
Miss Crothers ...	9-h.p. Argyll	12 24	4 30
Major Matson ...	6-h.p. Benz	20 18	7 30
G. C. Halahan ...	20.h.p. Dennis... ...	9 15	1 0
R. W. Buttemer ...	10-h.p. Decauville ...	13 46	3 20

Messrs. Pullman and Buttemer were stopped on the hill, the one by missing gears and the other by a broken accelerator wire. Messrs. Ponsford and Buttemer started the cars, while Messrs. Crothers and A. Buttemer took the times at the summit, a rise of 520 feet. After the competition, adjournment was made to the Huts Hotel for tea.



CLIMBING SNOWDON MOUNTAIN BY MOTOR CAR.—The Ariel Car at the summit of Snowdon.

HILL-CLIMBING IN NOTTINGHAM.

THE Nottingham A.C. at their hill-climb on Saturday had, in addition to the very good cars owned by members, the three Napiers driven in the Isle of Man by Mr. S. F. Edge, Mr. C. Earp, and Lieut.-Colonel Mark Mayhew. Two of the latest 28-h.p. Daimlers were also present, Mr. Stotesbury having driven his over from Bristol for the meeting.

The hill is known as Ab Kettleby, and is in Broughton, about 14 miles south of Nottingham on the Melton Mowbray road. It is 1 mile in length, and has a gradient of 1 in 21 for the first stretch of about 150 yards, then increases in steepness until 1 in 11 is reached, with a short bit of about 50 yards of 1 in 7. There are two slight bends, and on Saturday the early rain following a mist made parts rather greasy. All, however, got round well. The running of the three Napier cars in both their attempts, was remarkably even, as will be seen from the times. Both the 28-h.p. Daimlers in the tourist class made fast times, coming out a long way ahead of all the other competitors in this section.

Earp came in for a lot of attention, and neither he nor his car seem a bit the worse for their recent shaking up—Earp had certainly lost none of his nerve or coolness. He handled his car well and skilfully. A new set of Palmer Cord Tyres have been fitted, the original tyres having been secured by the makers as a practical demonstration of their staying qualities.

The following are the times accomplished by the cars. The handicap result will be announced later:—

SPEED CARS (Open Event).

Driver.	Type.	1st Run. mins.	1st Run. secs.	2nd Run. mins.	2nd Run. secs.
1 S. F. Edge ...	80-h.p. Napier ...	1	36	... 1	35
2 Mark Mayhew ...	80-h.p. ,, ...	1	37⅘	... 1	40⅕
3 Earp	55-h.p. ,, ...	1	40⅕	... 1	41
4 Bush	28-h.p. Daimler ...	2	5	... 2	6
5 Pearson	20-h.p. M.M.C. ...	2	50	... 2	35

TOURIST CARS (Club Handicap).

Driver.	h.p.	Car.	m. s.	Driver.	h.p.	Car.	m. s.
W. D. Wells	28	Daimler	2 15⅘	H. Bowden	24	Darracq	4 24⅖
W. D. Wells	28	,,	2 20⅗	D. Gass ...	10	G-Richard	4 40
J.T. Overton	24	G-Richard	3 24⅗	Harbidge ...	12	Gladiator	4 54
,,	16	,, (2-seated)	3 35⅖	G. H. Kirk	12	G-Richard	5 0⅗
Ernison ...	25	Humber	3 36⅘	Lalham ...	12	Progress	5 3⅘
C. Hardy ...	16	G-Richard	3 49	A. R. Atkey	12	G-Richard	5 9⅗
R. M. Wright	8	De Dion	4 11	O. Huskison	6	Wolseley	5 10
J. Burton ...	24	Darracq	4 17⅖	S. Harvey...	5	Renault	9 25⅘

CLUB DOINGS.

Berkshire Automobile Club.—At the invitation of Sir Gilbert A. Clayton East, Bart., the chairman of the club, a very successful motor gymkhana was carried through last Saturday at Hall Place, near Maidenhead. The splendid grounds were particularly suitable under normal conditions for this event. Unfortunately the heavy thunder showers of Friday morning had left the grass track, which had been got into splendid condition by careful mowing and rolling, soft and wet. This grass course was about a mile in circuit round the splendidly wooded park, one portion of it, 220 yards long, running parallel with the avenue of limes by which the mansion is approached, was devoted to special tests of skill and speed, although high speeds were not a feature of the programme. The whole of the events passed off without the smallest hitch or accident, and in all about 25 to 30 cars were on the ground, a less number than was anticipated, mainly owing to the unpromising weather. With one exception the owners of the cars drove them. Miss Thompson was, however, at the wheel of Mr. O. S. Thompson's Wolseley car in the "legal limit" race, in which she managed to secure second place, a very popular win. Sir Gilbert Clayton East also personally took part in the competition, driving his splendid Daimler carriage. The events and results were as follows :—

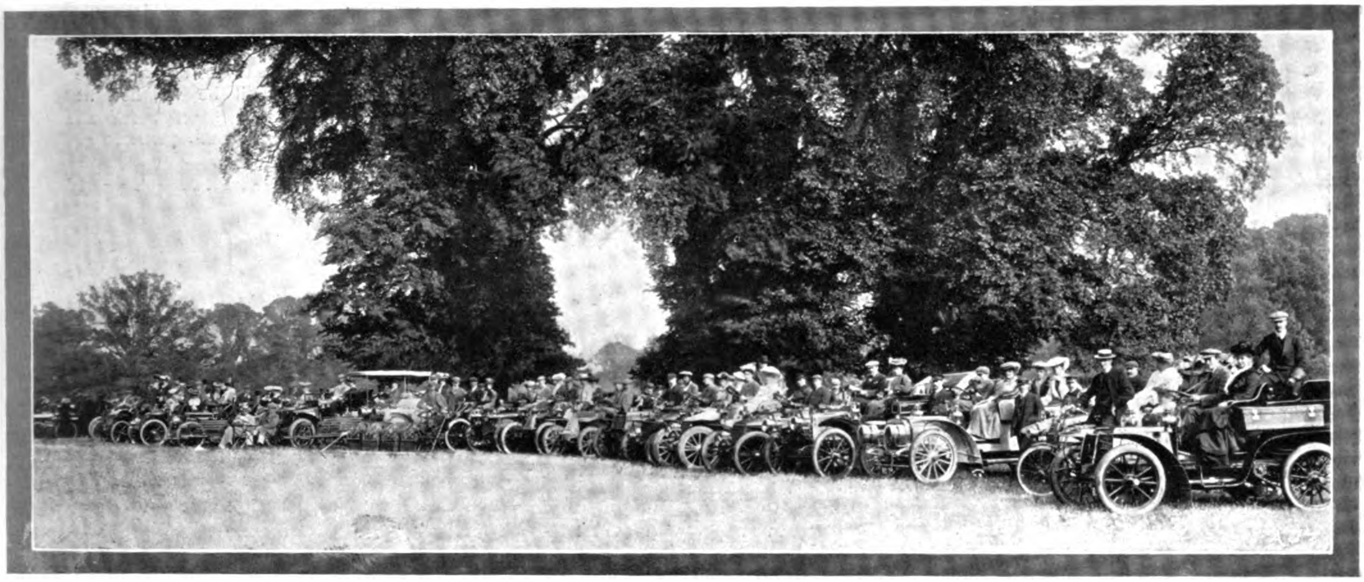


Photo by Argent Archer.

BERKSHIRE AUTOMOBILE CLUB.—Motor Gymkhana at Hall Place, Maidenhead, the residence of Sir Gilbert A. Clayton East, Bart., last Saturday. The cars in the park.

Bending Race.—Between staves. Forwards in and out of staves, round posts, and return same way. To be run in pairs.

1st, Mr. L. Barwell's 12-h.p. Clement; time, 1 min. 43 sec. 2nd, Lt.-Col. Waring's 9-h.p. Renault; 1 min. 46 sec.

Motor House Competition.—This was a contest in "pulling up," the cars, first making roughly the figure of a letter S around two flags, then reversing and backing into a narrow space between hurdles representing the "motor house." The winners were Mr. Littleton (7-h.p. Panhard) (in 17½ sec.), first, and Colonel Waring (9-h.p. Renault) (19 sec.), second. Mr. Graham Lloyd (8-h.p. Wolseley) did the task in 18 sec., but he and one or two other competitors did not back fully into the "house."

Ladies' Passenger Race for four-seated cars.—Owners to provide the ladies. To drive 100 yards, alight, assist lady from a chair to the back seat of the car, re-take seat, drive another 100 yards, and pick up another lady, as before, re-take seat, and drive to finish. This event was run in pairs, and created considerable amusement. The final order of the winners was:—1, Mr. Powys Lybbe (24-h.p. Bollée, with Miss Powys Lybbe and Miss Beck as "passengers"); 2, Mr. Barwell; 3, Mr. Shrapnell Smith (12-h.p. Lanchester).

Legal Limit Race.—Once round the course, with flying start, the car being timed over the full course. The object of this was to test judgment of speed and ability to keep to the 20-mile an hour limit. The course, being a mile long, the competitor who did the distance in a time nearest three minutes won. Dr. Norman Joy, on his motor bicycle, completed it in 2 min. 26 sec., and Mr. H. Powys Lybbe, on his Bollée car, in 2 min. 35 sec., both too quickly. Ultimately the winners proved to be:—1, Mr. Littleton (3 min. 7 sec.); 2, Mr. O. S. Thompson (car driven by Miss Thompson), (3 min. 16 sec.); 3, Sir Gilbert East (3 min. 16½ sec.). Other competitors were:—Mr. Shrapnell Smith (3 min. 19 sec.); Mr. Barwell (3 min. 44 sec.): Mr. Dodd (3 min. 50 sec.); Mr. Garcke (5 min. 8½ sec.); Dr. Paterson (4 min. 5¼ sec.); and Dr. Walters (driver, Mr. Parrish), whose car had special trouble with the ground (5 min. 36 sec.).

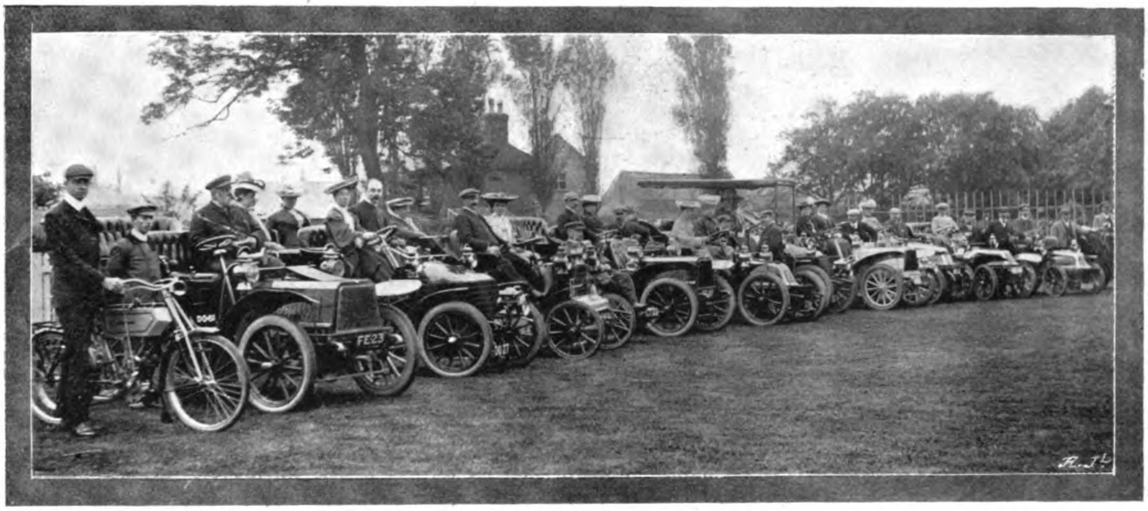
A motor bicycle race had to be abandoned owing to only one out of three competitors being present, and a final race was also abandoned owing to the earlier competitions occupying rather more than had been anticipated.

Burnley Automobile Club.—By way of familiarising the local authorities with the use of automobiles, the members of this club recently had an official run to Settle, when fourteen cars took part. The occasion was one of consequence as the mayors, town clerks, magistrates' clerks, and chiefs of police of Burnley, Padiham, Nelson, and Colne, were invited as guests. The run was successfully carried through and good friends made of the officials who were able to be present, the Mayor of Burnley, Mr. Alderman Cannington, and the Town Clerk, Mr. Gheldon, being well pleased with their experience, having been accommodated on Mr. Jesse Altham's 12-h.p. Napier car.

Eastern Counties Automobile Club.—Following the precedent last year, the "clerk of the weather" was unduly harsh upon this club's opening meet of the season, which took place on Saturday last, the run being to Bury St. Edmunds. It had previously been arranged to make one of the East coast seaside resorts the venue for the day, but, with the intention of helping to welcome the members of the Auto Cycle Club, whose run to Yarmouth was fixed for that day, this was changed, and Bury, one of the points at which the motor cyclists were to make a halt, was chosen instead. Owing to the bad weather the Auto Cycle Club run also proved disastrous as far as numbers were concerned, and altogether the meeting was disappointing from both the clubs' point of view. The members of the club who joined in the run to Bury included H. J. Wood on a 12-h.p. Peugeot, Messrs. O. T. and W. M. Cooke, of Polstead Hall, on an 8-h.p. Darracq, Mr. Forbes Gower on a 12-h.p. Darracq, Mr. Botwood on a 16-h.p. Argyle, Mr. and Mrs. Hossack on an 8-h.p. M.M.C., Mr. C. K. Moseley (the hon. secretary) on a 6-h.p. De Dion, Dr. Longworth on a 3-h.p. Rex motor bicycle, Mr. J. R. Egerton on a 2¾-h.p. Bat, and Mr. Leofric Hunter. The disappointment at having to return home without having been able to participate in welcoming their brother club members was very great.

Ladies' Automobile Club.—Next Thursday afternoon, June 9th, a motor meet of members of this club is announced to take place. Cars are to assemble in the open space by the Duke of York's Statue at the bottom of Waterloo Place, and at 3.30 the procession, headed by the Duchess of Sutherland, will proceed by way of Pall Mall into Birdcage Walk, and into Hyde Park by Constitution Hill. The circuit of Hyde Park will then be made, the cars then continuing their run to Ranelagh.

Lincolnshire Automobile Club.—Certainly one of the most interesting meets of the Lincolnshire Automobile Club took place on Saturday (May 28th), when ancient and historic Crowland was the rendezvous. Dr. and Mrs. Husband—themselves keen motorists—gave a very cordial welcome to the club members and their friends. The weather was not at all promising in the morning, for rain fell rather heavily at times, and this, no doubt had the effect of keeping many away. Although the sky was still overcast, the rain ceased by mid-day, and quite a nice show of cars assembled during the afternoon—some venturesome motorists coming from as far as Market Rasen and Lincoln. The following were amongst the party:—Mr. C. W. Pennell (Lincoln), with Mrs. Pennell, Mr. W. R. Pennell, and Mrs. Newsum, on a 12-h.p. Richardson; Mr. and Mrs. W. B. Jevons (Market Rasen), on a 9-h.p. De Dion; Mr. and Mrs. A. A. Padley (Market Rasen), on a 6-h.p. De Dion; Mr. George Linnell (Market Deeping), with Mrs. Linnell and Mrs. Stanton, on a 12-h.p. Wolseley; Mr. C. Holland and Mr. W. Kitwood (Boston), on a 5-h.p. Baby Peugeot; Major Goddard (Lincoln), on a 12-h.p. Richardson; Dr. Reckitt (Boston), on a 5-h.p. Baby Peugeot; Mr. W. A. Tomlinson (Sleaford), with Mrs. Tomlinson and Miss Searson, on a 5-h.p. Barden; Dr. Gilpin (Bourne), with Mrs. Gilpin and Mrs. Wade (Market Deeping), on an 8-h.p. Peugeot; Dr. Cragg (Billingboro'), on a 3-h.p. Enfield Quad; Mr. and Mrs. J. R. Richardson (Lincoln), on a 12-h.p. Richardson. Dr. and Mrs. Husband, on their 8-h.p. Wolseley; and Mr. C. Brookes, with a motor cycle, also joined in the photographic group. Dr. and Mrs. Husband invited several of their personal friends to meet the motorists, and after the company—which mustered between thirty and forty—had been entertained to a dainty tea, they started, with Mrs. Husband as guide, on an exploration of the old town. The abbey, which was founded by Ethelbald, King of Mercia, in 716, is still a beautiful building, and is highly interesting to the architect and antiquary. Part is in ruin, but one side is used as the parish church. The remarkable triangular bridge, if not the oldest in England, is certainly the most peculiar, and it is the object of almost as much curiosity as the abbey to the hundreds of motorists and other tourists who visit the place during the season. There are some very quaint and interesting inscriptions on the stonework. After viewing other places of interest the party returned to Dr. Husband's residence, where some photographs were taken as a souvenir of the visit, before the motorists bid "good-bye" to their genial host and hostess.



LINCOLNSHIRE AUTOMOBILE CLUB.—Meet at Crowland on May 28th, when the members and their friends were the guests of Dr. and Mrs. Husband. In our photograph the host and hostess are seen in their 8-h.p. Wolseley Car (D.O. 27), the second from the left of the picture, Mrs. Husband having charge of the wheel.

Leicester Automobile Club.—On Saturday last the fourth run of the season took place, when Rothwell, in Northamptonshire, was visited. Although dull weather was experienced the roads were in excellent condition, and a very pleasant outing resulted for all those who were able to take part, the ranks unfortunately being thinned owing to the Nottinghamshire Club's Hill Climbing Competition at Kettleby Hill, near Melton, on the same day. Those taking part in the run included: Mr. E. G. Mawbey (the president), and Mrs. Mawbey, Mr. Maurice Mawbey, Mr. and Mrs. A. Mawbey, Mr. R. E. Parker, Mr. J. G. McAlpin, Mr. Harris, Mr. Pierpoint, Mr. Earp, Mr. and Mrs. Peberdy, Miss Peberdy, Miss G. Peberdy, Mr. and Mrs. Whitby, Mr. and Mrs. Waite, and Mr. A. McAlpin (hon. secretary). Advantage was taken of the visit to inspect the noted charnel house underneath Rothwell Church, where, in the ancient crypt discovered about 200 years ago, symmetrically arranged stacks of human skulls and bones form an interesting, although weird sight, it being estimated that as many as 15,000 skeletons are represented. After a pleasant sojourn at the Red Lion Hotel the cars turned homewards, all arriving in good time at their destinations. One "good Samaritan" on the way home stopped to befriend a stranger's car which had broken down by the way, just outside Market Harborough, and having decided to assist by towing the car, the owner subsequently arrived home on Sunday morning about 3 o'clock, bringing with him as a peace offering to his spouse who was anxiously waiting his return, a huge bunch of lilac.

Sheffield Automobile Club.—Twelve entries have been received for the motor cycle hill climb at Padley Wood taking place to-day (Saturday). Machines and riders will be weighed at Grindleford Station, and the first competitor will start on the hill at 3 p.m.

Midland Automobile Club.—The weather at the opening of the Whitsun holidays was hardly conducive to well-attended runs into the country. In consequence only a few members of this club availed themselves of the arrangements to meet at Bettws-y-Coed. The small gathering of automobilists, however, who faced the unpromising weather in the first instance had no cause to regret their determination, and were enabled by the change which subsequently took place to make some very pleasant trips into the surrounding country. The journey to Bettws-y-Coed was made *viâ* Shrewsbury and Llangollen. The principal trips were as follows:—Llandudno *viâ* Llanwrst, returning *viâ* Conway, Capel Curig, Beddgelert, visiting the Pass of Aberglaslyn *viâ* Snowdon Ranger, through Carnarvon and Bangor to the Menai Bridge, passing over the bridge, the night being spent at Beaumaris. The return to Bettws-y-Coed was made *viâ* Menai Bridge, Carnarvon, Llanberis Pass, and Capel Curig. The members returned home *viâ* Oswestry.

NEXT Saturday, June 11th, the united club run to the Empire Hotel, Buxton, organised by the Manchester Automobile Club, promises to bring together a very imposing assembly of motor cars owing to the success which attended this excellent fixture last year.

THE establishment of an Autodrome at Versailles is under consideration by the Seine-et-Oise Automobile Club. The scheme provides for a macadamised road about 12½ miles long and from 65 to 82 feet wide, so that several cars will be able to race side by side. If carried through, a splendid fillip should be given to the French industry, So many abortive schemes of a similar character have from time to time been mooted, that it revives confidence somewhat to find the present proposition receiving the support of so serious and practical a body as the Seine-et-Oise Club.

The Automobile Mutual Protection Association. — A meeting of the Committee of this Association was held on Tuesday last, the Earl of Shrewsbury and Talbot, the President, in the chair. The report of a Sub-committee, appointed to revise the Articles of Association, was received and adopted, under which the principal recommendation is the appointment of a Finance and General Purposes Committee. The revised Articles will be submitted to an Extraordinary General Meeting on June 10th. The funds of the Association, it was reported, now exceed £2,000, and the current income is more than sufficient to meet current expenditure. An agreement with Messrs. Cordingly and Co. has been come to in respect to the Royal Agricultural Hall Motor Car Exhibitions, which will now be under the auspices and patronage of the Association. Sir David L. Salomons, Bart., and Col. R. E. Crompton, C.B., have intimated their willingness to accept offices as Vice-Presidents of the Association. Mr. E. Shrapnel Smith has undertaken the joint office of Secretary and Treasurer to the Association.

IMMEDIATELY upon the death of Marcel Renault, in the Paris-Bordeaux (Madrid) Race last year, our contemporary, *L'Auto*, opened a subscription list for the purpose of erecting a monument to M. Renault, as one of the pioneers of the automobile industry and a driver and sportsman of the very highest quality. A generous response was made, and on Thursday last, exactly one year and two days after the accident occurred, the monument was formally inaugurated at Billancourt. A very large number of friends assembled to do honour to their old comrade, and amongst the speakers at the ceremony who paid well-merited and graceful tributes to the memory of M. Renault were M. Henri Desgrange, the Editor of *L'Auto;* M. Mors, who spoke in the name of the Chambre Syndicale, and M. Lagneau, the Mayor of Boulogne.

The Monument recently erected, from subscriptions collected by "L'Auto," to the memory of Marcel Renault, who lost his life in the Paris-Madrid Race last year.

REGULATIONS governing the use of motor vehicles in the Royal parks have just been issued by the Commissioner of His Majesty's Works. The following is the text:—

Cycles, whether mechanically propelled or otherwise, and carriages and cars propelled or drawn by mechanical means, are admitted subject to the following regulations:—

1. Cycles, whether mechanically propelled or otherwise, and carriages and cars propelled or drawn by mechanical means, are allowed on all roads when open for carriage traffic.

2. No cycle, whether mechanically propelled or otherwise, or carriage or car propelled or drawn by mechanical means, is allowed to proceed at a greater pace than 10 miles an hour, or so as in any manner to endanger, or to be likely to endanger, the safety, or so as to interfere with the convenience of any person using the park.

3. No smoke or visible vapour shall be emitted from any cycle, carriage, or car propelled by mechanical means so as in any manner to endanger, or to be likely to endanger, the safety, or so as to interfere with the convenience of any person using the park.

4. Racing, unauthorized meets, plying for hire, the use of any part of the park for a standing place, riding or driving on the wrong side of the road, or driving two abreast, are forbidden.

5. No person shall drive or in any way use in the park a carriage or car propelled by mechanical means for the purpose of instructing or of being instructed in driving, managing, or repairing a carriage or car of this description.

Any person doing any act in contravention of these regulations is liable to prosecution under the "Parks Regulation Act, 1872."

FORTUNE did not favour the Yarmouth run of the Auto Cycle Club last Saturday, when it was hoped that a number of other motor cycle clubs would join in meeting the parent body at Yarmouth. The heavy down-pour of rain on the Friday had left the roads in a fearful condition, and when Saturday morning arrived only ten riders decided to make a start from the rendezvous at Barnet. Very slow progress was made, and the roads instead of getting better appeared to be worse, and when rain again commenced to fall heavily several of those who did start were reluctantly compelled to give up. The first to arrive in Yarmouth, about 2 o'clock, was the Hon. Hugh St. Leger, a few stragglers arriving subsequently at intervals, one by one. In a measure the fearful experience of Saturday was compensated for by a pleasant return journey on Sunday, via Ipswich and Colchester. Mr. and Mrs. Dunn, who were on a fore-car were unfortunate in running short of petrol on the outward journey, and subsequently were compelled to stop at Diss, owing to further complications brought about by a burst tyre.

A HIGH-SPEED motor water-cart is one of the most recent applications of automobilism to municipal purposes which is chronicled from Paris. The vehicle, which is provided with a 35-h.p. De Dion-Bouton steam engine, carries 5,000 litres of water, and the total weight when filled with water is 12,000 kilogs. The water is distributed from the rear of the water-cart by two spraying nozzles which spray it over the surface of the road, giving a very fine pulverising action which is said to be much more effective than the method of sprinkling hitherto characteristic of water-carts. The motor water-cart goes along at a rate of 15 kiloms. per hour, and is consequently enabled to proceed at a pace which does not practically impede the rest of the traffic. To Londoners, who are accustomed to see whole streets more or less held up by the slow moving horse-drawn water-cart, this prospect must appear highly attractive.

THE production of thoroughly solid and sound steel ingots for mill purposes is one which is of interest to every engineer, and the automobile engineer as much as anybody. One of the causes of flaws in shafts is the fact that they are rolled down from ingots which, cast on the ordinary old-fashioned principle, are very liable to have cavities in the middle. This is due to the solidification of the steel outside first and contraction away from the centre. It is completely obviated by the Riemer process of casting ingots, which consists of providing the mould with a head-piece lined with refractory material and heated to a high temperature by a large gas blow-pipe. The ingot is cast in this in the ordinary way, the blow-pipe flame playing inside the heated head-piece of the mould keeping the steel at the top liquid till long after the outside has solidified. Any pipe-like holes which are formed by contraction are thus filled up with molten metal from the top, and as the impurities always concentrate themselves in the steel that remains fluid longest, the general quality of the ingot is enormously improved. Shafting produced from ingots cast in this way is likely to be far more flawless than that obtained in any other manner.

A graceful speech was made by His Excellency the Lieut.-Governor of the Isle of Man, Lord Raglan, when presiding at a meeting of the Tynwald Court on Tuesday in last week. Alluding to the successful manner in which the Eliminating Races had been held, and the absence of accident, he praised the officials, the Highway Board, and the Chief Constable. A letter has also been received by the Chief Constable from Mr. J. W. Orde, the secretary of the A.C.G.B.I., thanking him on behalf of the Automobile Club for his aid and co-operation.

On Friday, May 20th, a paper entitled "Practical Notes on the Running of Motor Cars and Cycles," was read before the Junior Institution of Engineers by Lieut. W. G. Windham, King's Messenger, R.I.M. Lieut. Windham commenced by referring to the rapid growth of automobilism in this and other countries, and pointed out the importance of obtaining an unlimited fuel supply at a cheap price, such as would be found in alcohol if the material for its production were grown in this country. Lieut. Windham then turned to the real subject of his paper, which was to point out the changes which had been effected in the various details of a motor car, and show wherein he considered these changes were beneficial or otherwise, and what might be done to still further improve the parts which he referred to.

Rules have been issued by the Association Generale Automobile in connection with the Diploma of Efficiency which they are now prepared to issue to mechanic-drivers. Candidates must be over 18 years of age, and must be prepared to supply, amongst other things, certificates of their birth, the consent of their parents, if under age, to their marriage, a photograph in duplicate, &c. They will then be examined under four heads: 1. For driving cars, including starting, reverse driving, turning, uphill and downhill driving, stopping, &c. 2. Knowledge of the car's construction, including the motor, transmission, ignition, emergency repairs, pneumatic tyre troubles, &c. 3. Upon their knowledge of police and traffic regulations, &c. 4. Upon their physical and moral suitability, including sight, hearing, and morality. Candidates having successfully submitted to the Association's inquisition, and paid five francs, will receive a diploma holding good for one year only. This will have to be renewed annually, for which no charge will be made.

DOINGS OF PUBLIC COMPANIES.

New Issue.—The Sims Manufacturing Company (Limited), capital, £35,000, last week issued a prospectus offering 6,000 6 per cent. cumulative Preference shares of £1 each at par.

NEW COMPANIES REGISTERED.

[Taking powers to manufacture or deal in motors, motor cars, or accessories, either as their principal or part of their objects.]

Bristol Motor Company (Limited).—Capital, £15,000 in £1 shares, of which at least 10,000 (5,000 "A" and 5,000 "B") shall be ordinary shares. Object, to acquire the business now carried on at 4 and 5, Redcross Street, and 18, Victoria Street, Bristol, as the Bristol Motor Company. First directors, W. M. Appleton and G. W. Davey.

Caravan Restaurant Company (Limited), Registered in Guernsey.—Capital £100,000 in 25,000 preference, and 75,000 ordinary shares of £1 each. First directors, Stuart Dixon Ross, John Tweedie Scott, and G. Ross.

Crosby Motor and Engineering Company (Limited), 6, Crosby Square, E.C.—Capital, £2,000 in £1 shares. S. F. Wall is first managing director.

Dixi Motors (Limited), 20 and 22, Brompton Road, S.W.—Capital, £16,000 in £1 shares. First directors, R. S. Harger, J. B. Stanford, and Captain W. H. Benett.

Lagonda Motor Company (Limited).—Capital, £10,000 in £1 shares. Object, to acquire the business now carried on at Staines, Middlesex, as the Lagonda Engineering Company.

Marshall's Valve Gear Company (Limited).—Capital, £71,500 in £1 shares. Chief object, to acquire from J. T. Marshall, of Francis Street, Leeds, certain inventions relating to improvements in valve gear for fluid pressure engines. First directors, C. E. Charlesworth, J. T. Marshall (managing director), E. Wardle, and J. E. Firth.

Rapid Motor Vehicle Company (Limited).—Capital, £100 in £1 shares.

Sligo Motor Service Company (Limited), Irish Company, Bridge Street, Sligo.—Capital of £750 in £1 shares, for the purpose of running motor cars between Sligo and Ross's Point and between Sligo and Bundoran.

Speed and Power (Limited), 8b, Rumford Place, Liverpool.—Capital, £10,000 in £1 shares. Object, to carry on the business of manufacturers of and dealers in automobiles and components therefor.

J. Stone and Company (Limited).—Capital, £700,200 in 30,000 preference shares of £10 each, and 400,200 ordinary shares of £1 each. Object, to acquire the business carried on at Deptford or elsewhere as Josiah Stone and Co. or J. Stone and Co., of mechanical, electrical, and general engineers, manufacturers of and dealers in locomotive engines, motors, motor cars, and motor lurries. First directors, E. J. Preston, J. T. Prestige, S. Prestige, R. T. Preston, F. M. Preston, F. G. P. Preston, A. G. Preston, and W. R. Preston.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published May 26th, 1904.

10,643. J. and A. W. Prentice. Variable speed gearing.
11,032. C. H. Bryant. Carburettors.
11,147. A. Soames and W. Langdon-Davies. Change-speed-gear.
11,574. T. Garr Wheels.
13,138. J. H. Johnston. Carburettor.
14,779. C. T. and W. H. Barlow. Carburettors.
14,880. P. Shippobottam. Coupling or towing rod.
15,987. W. W. G. Webb and J. Hall. Motors.

Applied for in 1904.

Published May 26th, 1904.

3,130. — Gardner. Steering devices.
3,660. — Hennig. Magneto-electric ignition-gear.
5,693. Gould, Shapley and Muir Company. Water circulating and cooling apparatus.
7,604. M. Guttner. Differential friction gear.
7,701. A. A. Longuemare. Carburettors.
7,735. Vereinigte Maschinenfabrik Augsburg. Method of regulating internal combustion engines.
7,822. J. T. Douglas and F. H. Livens. Internal combustion engines.
7,983. C. A. Sawtelle and L. M. Spiegl. Explosion engines.

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NOTICE.—Advertisement instructions should reach the office, 44, St. Martin's Lane, W.C., by first post, Wednesday. The latest time for receiving small alterations for Advertisements is 12 noon, Wednesday. No alterations can be made after that hour.

DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
June 11	... 200 Miles Trial (Motor Cycling Club).
June 11	... Inter-Club Meet at Buxton (Empire).
June 11	... Automobile Races, Ranelagh Club.
June 18	... Hill Climb (Hertfordshire A.C.).
June 27–July 2	Motor Bicycle Endurance Trial.
July 2...	... 100 Miles Passenger Trials (Motor Cycling Club).
July 9...	.. Driving Cup Contest (Derby A.C.).
July 23	... Sunrising Hill Climb (Midland A.C.).
July 26–27	... Reliability Trials for Motor Boats.
July 30	... British International Cup for Motor Boats.
Aug. 20	... Hill Climb (Derby A.C.).
Aug. 27	... Challenge Cup for teams of 6 (Motor Cycling Club).
Aug.	... Hill Climb (Kent A.C.).
Sep.	... Midland A.C. Speed Trials.
Sep.	... Inter-Club Hill Climb, with Teams.
Sep.	... 250 Miles Trial (Motor Cycling Club).
Sept. ...	... *Reliability Trials.
Sep. 10	... Lanark Hill Climb (Scottish A.C.).
1905.	
Mar. 1	... *Light Van Trials.
Mar. 3–11	... Liverpool Motor Cycle Show.

Foreign Events (Trials, Races, &c.).

1904.	
June ...	... Dourdan Kilom. Trials (*L'Auto*).
June 17	... Gordon-Bennett Race.
June 22	... Kiel Motor Boat Races.
July 10	... Mont-Cenis Hill Climb (A.C. Italy).
July ...	... Speed Trials (*L'Auto*).
July 15–23	... Ostende Week.
July 15–20	... Ostende Motor Boat Races.
July 17	... Antwerp–Ostende Motor Boat Run.
July 25–26	... Circuit des Ardennes (A.C. Belgium).
July 26–Aug. 1	Spa Automobile Fêtes.
Aug. 8 9	... Calais-Dover-Calais (motor boats).
Aug. 10	... Calais-Boulogne-Calais (motor boats).
Aug. 14–20	.. Paris–Deauville Motor Boat Race.
Aug. 22	... Motor Boat Race for Gaston Menier Cup.
Aug. 22–Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28	... Ventoux Hill Climb (Avignon).
Sept. ...	... Deauville Automobile Meeting (*L'Auto*).
Sept. 2	... Chateau Thierry Hill Climb (*L'Auto*).
Sept. 10-12	... Lucerne Motor Boat Races.
Oct. 9	... Gaillon Hill Climb (*L'Auto*).
Oct. 14–22	... Leipzig Cycle and Motor Show.
Nov. 20	... 100 Kiloms. Trial (A.C. Algeria).
Dec. ...	... Paris Salon.

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* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Gordon-Bennett Race.

ALMOST as soon as the next AUTOMOTOR JOURNAL is in the hands of our readers, the great racing event of the automobile year will have been fought and won. The last year's Gordon-Bennett Race was the first occasion on which this event emerged into separate and proper prominence. Previously the Gordon-Bennett Race had been a sort of appendage or parenthesis to the great races that were annually held from Paris to some distant city. If Mr. Edge's win for England in 1902 did nothing else, it had the very valuable and important effect of converting the Gordon-Bennett Race into a separate event, and thus bestowed on it an importance, and concentrated on it a degree of public attention, which it had not previously possessed. But the English victory of that year did much more than this. It enabled the A.C.G.B.I., in conjunction with the Irish authorities, to show that automobile racing, even without restrictions as to the power of the competing vehicles, could be carried out without danger to the public, and without serious accident; and it certainly evoked an amount of interest in the movement generally, which has largely benefited the British automobile industry. Another British win would benefit that industry, probably, in an even higher degree, and it is for that reason, among others, that every automobilist in this country, and for that matter everyone who desires the growth of his country's progress, must be now hoping his hardest that 1904 will witness the cup once more brought back across the Channel. Whoever be the actual winner, we feel that the reputation of this country will be well maintained by the cars, and above all by the drivers who have been selected to represent the English club.

"You should never prophesy unless you know." But it is a prophecy, with much less risk attaching to it than usually accompanies utterances of the kind, to say that the 1904 Gordon-Bennett Race will probably be the last which will be held under the existing rules. It has been more and more felt by almost everyone that the manner in which engineers have been able to increase the power of their engines within the last few years without correspondingly increasing the weight of their cars, has made the racing automobile capable of attaining such enormous speeds on "the straight" that the limits of human endurance on the part of the drivers, and certainly the limits of rational regard for consequences, are readily exceeded. It is true that last year the race was won by what was practically a "touring" car, and that the times recorded were not excessive; but this was probably—in fact, almost certainly—due to the character of the Irish course. It was only for comparatively short stretches that the racing cars were able to attain their maximum speed. Something of the same kind will probably be witnessed in this year's contest in the Taunus. The German course is quite as angular as the Irish, and has many more serious gradients and corners. There will thus be constant checks to the development of maximum speed, and it is therefore quite possible that the car which most approximates to a "touring" vehicle will again be victorious, as was the case last year.

This result would appear to be exactly what is wanted. The more the Gordon-Bennett Race tends to promote the victory of cars of this type the more it will be of interest and value to the public, to the private buyer, and in consequence to the industry. This is quite true, but it does not appear to be a rational way of attaining this result to impose no further limit of power on the competing cars than results from the existing 1,000 kilog. weight-limit, and then to select a course which is so serpentine and trying that it amounts to a serious handicap on the highest-powered competitors. What is wanted is that the feeling should become general that cars which might win such an event on a straight course like Paris-Berlin or Paris-Bordeaux would not necessarily be successful competitors in the Gordon-Bennett Race. If automobile racing is to retain its usefulness and its hold upon public interest, something will have to be done (either by further restrictions in regard to weight or limiting engine power) which will tend to cause the winning car to resemble, as far as possible, a practical touring vehicle.

The elaboration of rules to attain this end will be no easy matter. It will require the co-operation of the best technical and practical talent, but in the interests of automobile racing as a sport, and in the interests of motor car designing, as affected by that sport, it will have to be taken in hand. Fortunately the unsatisfactory effect of the alteration in the rules made last year, by which chauffeurs not members of the competing clubs are now permitted to drive, gives occasion for a review of the existing rules. The first reform of limiting the weight to 1,000 kilogs. was designed to prevent the race being won by mere monstrosities. This, for a time, it did. The next reform needed is one that will tend to give the cup to the best all-round car.

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All's Well That Ends Well.

MR. S. F. EDGE has decided to do the right thing, as we felt all along convinced (and said) that he would do. In spite of his protest, and in spite of the fact that he had emphasised this protest by the rather extreme step of requesting the committee to relieve him of his obligation to drive for the English club, he has, as will be seen from our correspondence column, on the representation of the committee that they could not agree to excuse him, and calling upon him to decide, by return of post, whether he would drive or not, stated that he intends to drive, "and will at once make preparations to do everything possible, as far as myself and my car are concerned, to assist the other two members of the team, so that the three of us may put up the best possible fight for Great Britain in the Gordon-Bennett Race." This is the right spirit, and all who desire to see the English team as strong as possible will feel that, in spite of the prolonged discussion, "all's well that ends well."

The controversy has not been an altogether pleasant one, and it was as well that Lieut.-Col. Mark Mayhew, by bringing forward his motion before the Executive Committee for referring back the decision of the Races Committee to that body for reconsideration, gave an opportunity to Major Lindsay Lloyd, the vice-chairman of the Races Committee, to point out that it was largely out of good nature and consideration for Mr. Earp in his misfortune that the Races Committee had added to their decision the declaration which had unfortunately provided the opportunity for the discussion, and that the committee did not first come to one decision and subsequently alter it to the disadvantage of Mr. Earp. In any case, if the decision were to be reviewed, Major Lloyd made it plain that, to be consistent, an entirely new trial would have to be held to which the whole of the original competitors must be again admitted. At the present late date this would be an impossibility.

Even without taking the accident in consideration, it must be borne in mind that, as stated by the Races Committee in their letter, the speed of Mr. Earp's car, both on the hill-climbs and over all the distances on which the cars were actually timed—a total of 30 miles—was not equal to that of the two Wolseleys which are included in the English team.

The ultimate result will be satisfactory to everyone, and every English automobilist will be glad that this country will be represented by drivers who command everyone's confidence. If neither Mr. Edge, Mr. Girling, or Mr. Jarrott are successful in carrying off the cup, there is no one who will not be fully convinced that they have done their very utmost in the struggle.

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But Why Not Publish Results?

MR. EDGE puts forward the suggestion that all the times done by the different cars, as taken by the committee's time-keepers during the Isle of Man trials, might usefully be published. That there can be little objection to this being done, and that such publication cannot be of any benefit to competitors of other nationalities is pretty clearly shown by the circumstance that, after making their selection as the result of a real race in the French Eliminating Trials, the French club has, as a matter of public interest, published the net times registered against the different competing cars. If a similar course were taken by the Races Committee of the A.C.G.B.I., the information would be found by the automobile public to be of very considerable interest. No doubt, too, it would incidentally show that the ultimate choice of the committee is absolutely justified, and that the selection of the three champions who are actually to represent the club on the Taunus Course is the best possible that could have been made. As we say, after the action of the French club, there is little reason for assuming that publishing the figures could in any way seriously prejudice the chances of the English competitors, but should there be any lingering doubt that some advantage might be gained by foreign competitors through letting the figures be known, possibly the Races Committee might see fit to publish them after the Gordon Bennett Race has taken place.

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Re-animating the Juggernaut.

MR. WASON and Sir Edward Strachey, after a long period of quiescence, have broken out again in anti-automobilist eruption. They are very angry with Mr. Long and the Local Government Board for not bowing down before local Bumbledom, and agreeing to the imposition of the 10-mile limit whenever and wherever these local quidnuncs may desire. Mr. Wason's description of the circumstances under which the 1903 Bill was passed are distinctly amusing. He suggests that the condition on which the House accepted it was that the local authorities should be the "masters of the situation." By this, Mr. Wason evidently means that they should both have and exercise the power of reducing the speed limit to 10 miles. Needless to say, there was no such arrangement as he described. Because the Local Government Board has refrained from imposing the 10-mile limit where there was no real reason that it should be introduced, simply because a reactionary local body demanded it, Mr. Wason says that these authorities "have been snubbed and their recommendations treated with no respect whatever." Sir Edward Strachey took the same line, and desired the imposition of fresh restrictions, while even more reactionary Sir F. Rasch wanted to have motorists imprisoned for their first offence. Mr. Long made short work of the whole outbreak. He pointed out that the Act was working very well, and that there was no real need for the general introduction of the 10-mile limit. There might be special streets or places where it was advisable. The local authorities who had applied, generally wanted the limit for the whole of their districts. If they had had the moderation to ask for it in the case of a few dangerous places, Mr. Long's attitude would probably have been different, but of course this was not really what the local authorities wanted at all. Mr. Long has been wise in refusing to allow them to make use of the machinery of the Act simply to assist in retarding the growth of the industry.

The outbreak of the Parliamentary automobilists synchronises, as we anticipated it would do, with the return of the dusty period of the year. When the dust-laying preparations which are now proving themselves so effectual are more generally employed, one of the satisfactory results will probably be to economise Parliamentary time, by moderating the rancour of these and other similarly minded members.

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Some Problems in Aeronautics.

IN another column we publish an excerpt of the paper read before the Aeronautical Institute by Mr. T. W. K. Clarke. The paper is a useful theoretical contribution to the subject, as it deals with the forces which act on aeroplanes in a clear and lucid manner. Our readers who have followed the recent experiments with aeroplanes will call to mind that the most satisfactory practical results have been obtained, not with machines in which flat surfaces are employed, but with those in which the surfaces are concave to the ground, a form called by some people aerocurves. It was, we believe, the unfortunate Lilienthal who first introduced this form of surface. It was successfully employed by Chanute, and is the form which the Brothers Wright made use of in their renowned glides and flights. There are two interesting facts about the "aerocurve" as opposed to the aeroplane. It gives a greater lifting power, and the lifting force has what the mathematicians call a forward component. This means that there is a tendency for the air to push the aerocurve forward and this explains, what was a puzzle to a good many people at the time, that the Wright Brothers in some of their flights, without any motor propulsion, and while, as it were, sliding down the air, actually slightly rose in the air at the same time.

The explanation of this is that surface friction causes an upward eddy in the air which sweeps under the forward edge of the aerocurve. It is as if the aeroplane, while gliding along nearly horizontally, were at the same time being pushed upwards by a wind blowing from below and behind. It is in this way that the apparently paradoxical result obtained by the Wright Brothers of starting from the top of a hill, and by the action of gravitation, actually rising above the starting point, while gliding against the wind, is to be explained. Mr. T. W. K. Clarke assumed that the calculations he has made for flat surfaces may be applied to curved ones, and that for every aerocurve there is a somewhat larger aeroplane, which, when travelling forward through the air, would give the same lift. This method of comparison has been proposed by others previously, but it would appear not to be quite correct, as the rate at which the air rushes round the forward edge of the aerocurve determines the upward and forward thrusts. Speed through the air, therefore, would have to be taken into account, and the faster the machine moves through the air the greater would appear to be the superiority of the aerocurve. Aerocurves are likely to play a prominent part in aeronautical design in the future, and it is a pity, therefore, that the data applicable to ordinary aeroplanes cannot be applied to them with any great degree of accuracy, but we fear they cannot.

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Exceptional Treatment Again.

ONLY last week we referred to the new regulations issued by his Majesty's Chief Commissioner of Works and dealing with the admission of automobiles and the exclusion of certain other "pests" from the parks. One of the principal regulations which we subjected to criticism was the introduction of the 10 miles speed limit, but in return for this restriction the rules permit motor cars to use *any* of the roads through the parks on which other traffic is allowed, Now it is stated that one of the roads across Hyde Park which is open to horse-drawn traffic has been closed to certain motor cars. This action is the more arbitrary, as electric broughams are permitted to use the road in question. We should very much like to know whether the authorities who deal with the Parks under the Chief Commissioner are not, in taking this course of action, proceeding *ultra vires*. When the Commissioner draws up rules and regulations he has, we believe, to lay them before Parliament. We raise the question whether an under official has the power or the right to act in flat contradiction to regulations already so placed upon the table of the House of Commons. We submit there is considerable doubt whether the Chief Commissioner himself would have the power to alter his own regulation without notifying Parliament of the alteration. If regulations may be made one day and solemnly laid before Parliament, and a regulation of a diametrically opposite character enforced the following week, the whole procedure tends to resemble a farce.

THE GORDON-BENNETT RACE IN GERMANY.

How to See the Race.

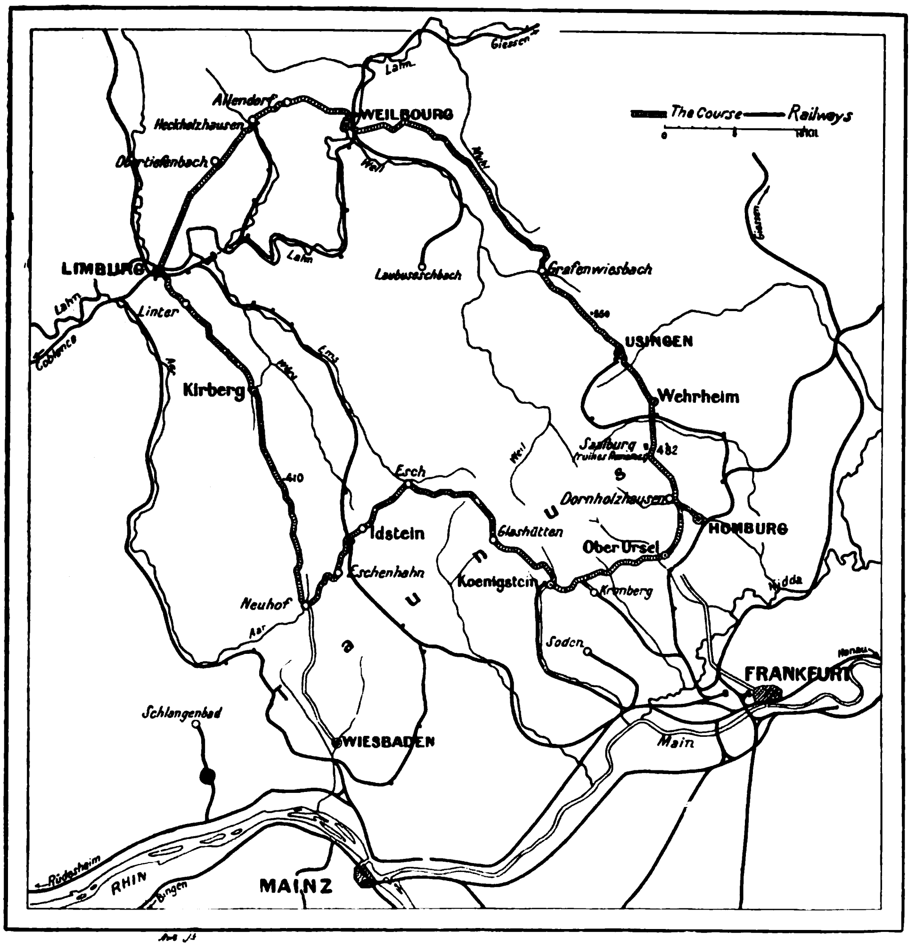
WE will assume that the visitor is starting from Homburg, at which town he will have no particular difficulty in arriving either by train or by car, and we will assume that he desires to proceed to a seat on one of the grand stands at the Saalburg. The authorities have been at considerable trouble to improve the by-roads, which were formerly nothing better than cart-tracks through the wood, so as to enable the Saalburg to be reached without proceeding along the road forming the actual Gordon-Bennett course, which will be completely closed to traffic on the day of the race. One set of these newly constructed roads is being set apart for the use of horse-drawn vehicles and the other for automobiles. If the visitor is in possession of or has hired a *horse* vehicle, he will proceed to Kirdorf by way of the road which runs straight along outside the Spa Park. He then goes straight on to the bend shown on the sketch map, where a chemical works is situated, and turns to the left into what is called the Rotlaufweg, which runs straight up to the Saalburg. Two kiloms. back from the Saalburg, a clearing has been made in the woods, and fenced in, in which the horse-drawn vehicles may be "garaged." This "garage" will be connected with the grand stand by telephone, so that visitors can call up their carriages when they require them. As they will not have to cross the course during the race, they can presumably get away at any time they like. Pedestrians are also recommended to take the same route.

Those who desire to proceed from Homburg to the Saalburg by *automobile* must proceed to that point by the Lindenweg, which they will reach by the Elisabethen Schneisse. This road runs straight from the old castle at Homburg, which may be recognised by its very characteristic and picturesque old round tower. The Elisabethen Schneisse is quite straight until after the Gothisches Haus is reached, at which there is a turning to the right going to Dornholzhausen. It is at the Gothisches Haus that a large garage for automobiles has been arranged. From here the cars run straight on and turn to the right up the Lindenweg; they come back down the parallel road called the Königwilhelmsweg and go back to the Gothisches Haus, where they can be garaged during the race. This garage is also connected by telephone to the grand stands at the Saalburg, and owners can call up their cars by telephone when they want them.

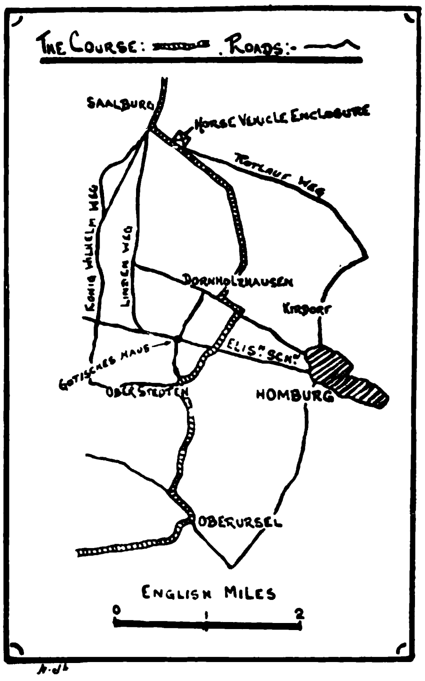
GORDON-BENNETT CUP RACE.—At the German frontier. Examination of "papers."

Automobilists will, of course, bear in mind that the race commences at 7 o'clock, but it is understood that the point at which the Elisabethen Schneisse crosses the course will not be blocked till about eight, or until the approach of the first of the competitors is signalled. We gather that the cars will be permitted to cross later, as long as no competitors are signalled as approaching. But no definite regulation in regard to this point appears as yet to have been promulgated. All automobilists will therefore be wise to have timed their departure so as to arrive in the Lindenweg by eight o'clock, so as to prevent the possibility of stoppage and disappointment.

Very complete arrangements have been made for the accommodation of the spectators in the neighbourhood of the Saalburg, two grand stands, for the design of which Herr Geh. Baurath Jacobi is responsible, having been erected on either side of the course. Together they will provide accommodation for some 2,500 spectators. The two stands are connected by a tunnel, and three bands will be in attendance, and will play alternately during the day. The admission fee to the grand stands is £2 10*s*. Those who pay for places will have the satisfaction of knowing that there is little chance of the refreshment department being overtaxed, as the organisers are making commissariat arrangements for from 20,000 to 30,000 visitors. The grand stands will be provided with 10 telephone call offices, situated close to them, and spectators will be kept informed of the progress of the race by wireless telegraphy. For this purpose the Arco-Slaby Company are fixing up three stations, one being at the Saalburg, the others, which consist of portable apparatus carried on carts, being stationed at Neuhof and Grävenwiesbach. The portable stations are going to have kites for carrying up their vertical wires if the day is windy; if it is calm they will use small hydrogen balloons. The Saalburg will thus be in touch with two other parts of the course; and the data received at the Saalburg station will be promulgated from time to time.



Map of the Gordon-Bennett Course for 1904, which takes place in the Taunus district on June 17th. The cars starting from the Saalburg travel round the course in a counter-clockwise direction.



Road Map showing the routes which must be followed from Homburg to the Saalburg by motor cars and other vehicles. An explanation of this map will be found elsewhere.

For those who do not take tickets for the grand stands, an enclosure of 10 kiloms. in extent has been made round the Saalburg, to which admission can be obtained for 20 marks (£1), while from the grand stand a path runs through the woods to a point on the course at which it is expected high speeds will be attained. Two elevated towers have also been erected in the Saalburg enclosure to enable distant views of the course to be obtained. The 20 marks which admits to the enclosure confers the right to use these towers. A third similar structure, to which the admission is 5 marks, is near Dornholzhausen.

Wehrheim, which next to the Saalburg will be one of the most frequented points on the course, can boast a large stand erected at the spot called Kloster Thron, by the editor of our comic contemporary *The Schnauferl*, Herr Willy Vogel. The admission to this stand will be 20 marks, and a good supply of refreshments and music will be available.

The majority of visitors no doubt will approach the course from the Homburg side, and concentrate themselves on the points we have referred to, but it may be well to recollect that good views of the race will be obtainable on the eastern side of the course in the neighbourhood of Limburg, and that this side is very accessible by car from Wiesbaden and Coblenz.

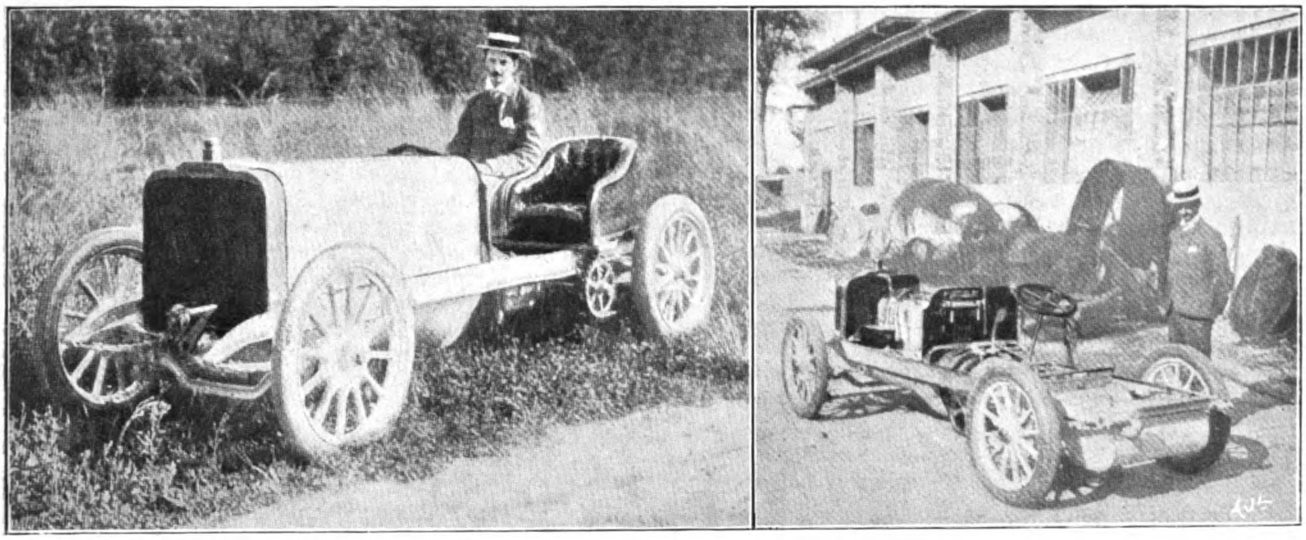
For those who naturally dread the dust it will be consoling to learn that the main points on the course, particularly those in the neighbourhood of the grand stands, will be treated with Westrumite or oil, and this will also be applied on the new roads leading to the Saalburg to which we have above referred.

The State railways are doing their utmost to rise to the occasion, and a ten minutes' service will be run from Frankfort and Homburg to the Saalburg. The electric railway also from Homburg to the Saalburg will be running all the time, and is capable of conveying 600 passengers per hour. It likewise runs to Dornholzhausen, to which point it can convey a similar number. Attempts have been made to organise a special omnibus service between Homburg and the Saalburg, but they have failed owing to the exorbitant demands of the omnibus proprietors.

For the guidance of our readers, many of whom will doubtless be present on the Taunus course to witness the great event of the year, we publish a map of the course itself, together with a small sketch map, designed to show the best methods of reaching the Saalburg and other adjacent parts of the course from the town of Homburg. It is naturally the Saalburg which the majority of visitors will desire to reach, as the race both starts and ends at this point, and it is here that the largest stands are being erected.

From this point, too, the race will be witnessed by the German Emperor and Empress.

It will be observed that the larger map shows the slight alteration in the course which has been made since the former map was published in our columns. Formerly the course ran from Oberursel more to the right, taking the road which runs practically through the outskirts of Homburg itself. This was thought too dangerous, and the course altered so as to run over the road passing through Ober-Stedten to Dornholzhausen instead.



GORDON-BENNETT CUP RACE.—The Swiss Automobile Club have entered a vehicle constructed by MM. Piccard and Pictet. This car is seen in our photograph (taken from our Swiss contemporary, "La Suisse Sportif"), and M. Frederic Dufaux, who will drive in the Race, is seen in both pictures.

GORDON-BENNETT ITEMS.

This order of starting of the cars representing the various countries and the distinguishing colour for each country is officially announced as follows:—

	Starting order.			Colour.
Germany	1	8	14	... White.
England	2	9	15	... Green.
Austria	3	10	16	... Black and yellow.
Italy...	4	11	17	... Black.
France	5	12	18	.. Blue.
Belgium	6	13	19	... Yellow.
Switzerland... ...	7			... Red and yellow.

This order of starting has been determined by the date of the receipt of the challenge from each respective club, Germany, of course, leading off the race as the holder of the cup. Jenatzy, who won the cup last year for that country, will be the driver of No. 1 car on behalf of Germany.

The following table gives the distances from the starting point, the Saalburg, to the various places on the course, which are indicated in the map which we publish this week:—

	Kiloms. =	Miles (approx)		Kiloms. =	Miles (approx)
From Saalburg—			To Neuhof ...	89·8	56·0
To *Wehrheim	3·7	2·3	,, *Idstein ...	97·9	61·0
,, *Usingen ...	8·3	5·2	,, *Esch ...	105·8	65·5
,, Grävenwiesbach ...	17·2	10·7	,, Glashütten	113·3	70·5
,, *Weilburg...	37·8	23·5	,, *Koenigstein	119·8	74·5
,, Allendorf ...	44·6	37·7	,, *Oberursel	130·0	81·0
,, *Limburg ...	61·3	38·0	,, Dornholzhausen ...	137·6	85·5
,, Kirberg ...	72·8	45·0	,, Saalburg ...	141·1	87·5

*Controls.

The drivers for each country, their nationalities, and their cars are:—

Germany: Jenatzy (Belgian), Mercedes; Baron de Caters (Belgian), Mercedes; Fritz Opel (German), Opel Darracq.

Great Britain: S. F. Edge (English), Napier; C. Jarrott (English), Wolseley; S. Girling (English), Wolseley.

Austria: Werner (German), Mercedes; Braun (German), Mercedes; Warden (American), Mercedes.

Italy: Storero (Italian), Fiat; Landseer (Italian), Fiat; Cagno (Italian), Fiat.

France: Théry (French), Richard Brazier; Salleron (French), Mors; Rougier (French), Turcat-Mery.

Belgium: Baron de Crawhez (Belgian), Pipe; Hautvast (Belgian), Pipe; Augieres (French), Pipe.

Switzerland: F. Dufaux (Swiss), Dufaux-Piccard-Pictet.

As we announced a short time ago, the race will start at 7 in the morning of Friday, the 17th inst., and the cars will be dispatched at intervals of 5 minutes instead of 7 minutes.

The latest official hour for the race to terminate will be 9 p.m., but in the ordinary course it is calculated that the race should actually be finished before 5 o'clock at the latest.

The neutralised points will be Wehrheim, Usingen, Weilburg, Limburg, Idstein, Esch, Koenigstein, Oberursel. From the controls the cars will be sent off at intervals of two minutes when they arrive at controls sufficiently closely to enable this to be done.

The Emperor and Empress of Germany are due to arrive at Homburg on Wednesday next, the 15th of June, and will remain until after the race has been run.

The Napier headquarters, until after the Gordon-Bennett Race has been run, will be at the Savoy Hotel, Homburg.

At Frankfort, the firm of Louis Peter, the makers of the Peter tyre, have arranged for their garage near Frankfort Station, which will accommodate about 200 automobiles, to be free to all automobile visitors during their stay in Frankfort for the Gordon-Bennett festivities. Ulrich, of Frankfort, is making special arrangements for looking after repairs and supplying motor spirit and accessories, whilst the Frankfurter Reklame Gesellschaft, of 58, Kaiserstrasse, Frankfort, are placing their reading room at the disposal of all visitors for correspondence, &c.

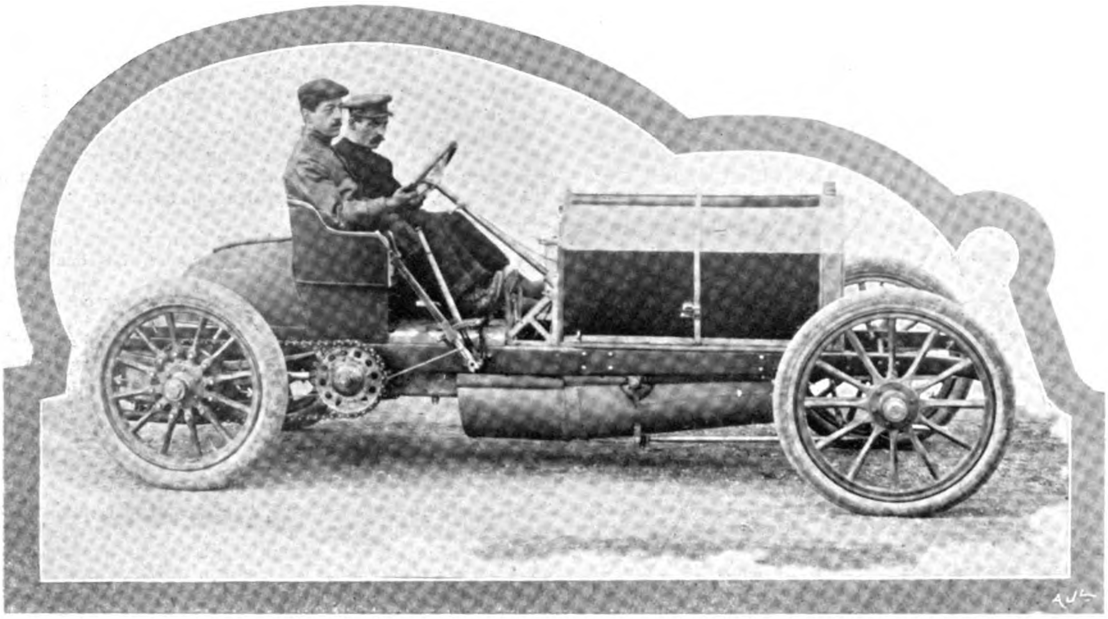
Several members of the club who are going to the Gordon-Bennett Race left London on Friday the 10th inst., for Harwich and the Hook of Holland; from the latter town they are driving their cars *via* the Hague, Nymegen, and Bonn to Homburg. The run of some 330 miles will be taken easily, three nights being spent on the road, and Homburg being reached on the 15th, in good time for the race on the 17th. Among the party are Mrs. Gerard Leigh, who will drive her 15-h.p. C.G.V., Mrs. Money Coutts, Mrs. Dawson, and Mrs. Lloyd, each driving 20-h.p Daimlers, and Mrs. Manville with her 28-h.p. Daimler.

The A. C. de France have now published the official nett times occupied by the various cars competing in the Gordon-Bennett Eliminating Trials, in completing each round of the course. It will be noticed that the first ten cars are placed in the same order as that in which we published them in our issue, May 28th last, but whereas then there was but little guidance to be obtained from the average gross times per lap, the average nett times for each of the first ten cars, which we now publish, clearly indicate their proper placing. A careful examination of the table, as regards the performance of the three chosen cars driven by MM. Théry, Salleron, and Rougier, respectively, reveals the very interesting fact that, from the start, they maintained their correct relative order, and ran after one another with surprising regularity, only Théry gradually gained on the other two, between whom there was not such a noticeable difference in speed. The fastest time in which any one lap was accomplished was 48 mins. 44⅘secs., which was the performance of H. Farman, on his Panhard-Levassor, the next best time was also Farman's, these being made in his second and first rounds, respectively, while the individual times of Gabriel and Teste for their best rounds are the two next fastest.

Only one vehicle has been entered on behalf of Switzerland. This car, which has been built in Geneva, to the designs of MM. Dufaux frères, by MM. Piccard et Pictet, is particularly interesting in consequence of the adoption of an 8-cylinder engine for driving it. The car is of the chain-driven type, and as will be seen from our illustration, it somewhat resembles the Darracq racers in outward appearance, having a very large square bonnet. The chassis has a pressed steel frame, the wheel base is 2·53 metres, the track 1·27 metres, and all four wheels are shod with 810 mm. tyres, for the manufacture of which special arrangements have had to be made in Switzerland. The engine has its cylinders cast in pairs, and the jackets around them are formed of aluminium; they have a bore of 125 mm., and the stroke is 130 mm. The inlet-valves are mechanically operated, and two independent ignition systems are fitted—high tension with accumulators, and low tension with magneto. The change-speed-gear gives three forward speeds and a

FRENCH GORDON-BENNETT ELIMINATING TRIALS—OFFICIAL NETT TIMES.

Official No.	Description and Driver.	Official Nett Time occupied in completing the Course (57⅝ miles per lap).						Average Time for the Six Laps.
		1st Lap.	2nd Lap.	3rd Lap.	4th Lap.	5th Lap.	6th Lap.	
		h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
5	85-h.p. Richard Brazier (Thery)	50 35⅕	50 28⅖	51 50⅖	56 16⅘	51 16⅗	1 0 0	53 24⅗
7	100-h.p. Mors (Salleron)	51 26⅗	53 21⅕	59 21⅖	58 33⅘	1 1 49	55 30	56 40⅗
10	100-h.p. Turcat-Mery (Rougier)	55 36	56 12⅘	1 1 8⅕	58 12	57 7⅖	56 49	57 30⅘
11	De Dietrich (Gabriel)	49 30⅕	50 34⅖	54 34⅖	59 44⅘	1 8 53⅘	1 5 3⅕	58 3⅖
6	100-h.p. Serpollet (Le Blon)	1 2 15⅖	1 0 20⅖	1 4 46⅕	1 1 0	1 3 26⅗	1 3 33⅘	1 2 33⅗
15	Richard Brazier (Caillois)	52 56⅕	1 12 52⅘	53 37	54 49⅘	1 14 29⅗	1 12 41⅘	1 3 34⅗
18	100-h.p. Panhard (Teste)	49 38	1 0 27⅕	1 11 7⅘	59 53⅘	1 33 54⅗	1 5 22⅖	1 5 3⅘
8	100 h.p. Panhard (Farman)	49 10⅘	48 44⅗	56 16⅖	1 26 38⅕	1 4 12⅕	1 45 57	1 8 30
26	Serpollet (Pelzer)	57 48⅘	1 26 36⅖	1 14 16⅖	1 14 13	1 7 14⅖	1 5 18⅗	1 10 54⅖
3	80-h.p. Clement-Bayard (A. Clement)... ...	52 42⅕	56 49⅕	1 13 19⅖	2 13 22⅖	56 42⅖	57 57	1 11 48⅘
21	De Dietrich (Jarrott)	57 20	59 29	1 8 37	1 13 33	2 42 19	—	—
20	80-h.p. Turcat-Mery (Touloubre)	2 44 38	1 23 6	1 9 5	1 26 44	1 37 22	—	—
25	Richard Brazier (Stead)	52 2	1 2 51	1 19 39	58 32	—	—	—
24	115-h.p. Hotchkiss (Amblard)	54 57	57 25	57 23	—	—	—	—
17	Mors (Leger)	54 27	56 25	5 17 14	—	—	—	—
12	90-h.p. Darracq (Béconnais)	1 7 35	1 16 39	1 19 34	—	—	—	—
1	100-h.p. De Dietrich (Baron de Forest) ...	59 51	59 54	1 24 48	—	—	—	—
27	Mors (Lavergne)	50 39	1 2 43	—	—	—	—	—
4	100-h.p. Hotchkiss (P. de Crawhez)	4 10 39	1 0 27	—	—	—	—	—
19	Gobron-Brillié (Duray)	1 5 8	2 14 44	—	—	—	—	—
28	100-h.p. Panhard (Tart)...	1 32 41	2 17 23	—	—	—	—	—
29	Gobron-Brillié (Burton)	53 14	—	—	—	—	—	—
16	Serpollet (Chanliaud)	1 0 13	—	—	—	—	—	—
22	90-h.p. Darracq (Wagner)	1 5 40	—	—	—	—	—	—
23	100-h.p. Clement-Bayard (Guders)	4 27 25	—	—	—	—	—	—



GORDON-BENNETT CUP RACE.—The Fiat Cars, which will represent Italy in the Race, have in open trial shown some fine speed qualities, considerably exceeding 80 miles per hour. One of the three cars is shown in our photograph, it being the one to be driven by Cagno, who is chauffeur to Queen Marguerite of Italy.

"reverse," and the car is fitted with ball bearings throughout, including, it is said, the crank-shaft. A direct through-drive is obtained to the countershaft when the top gear is in use, and the gear wheels are of such a size that the car then travels at about 84 miles per hour, when the engine is running at its normal speed of 1,200 revs. per min. The engine is said to develop about 90-h.p. when running at normal speed. The steering gear on this vehicle appears to be of unusual design, although arranged so as to be irreversible; the steering heads, too, appear to differ from ordinary practice, in that they are arranged inside the hubs of the front wheels. It is also reported that brakes are fitted to the hubs of the front wheels as well as to the rear wheels, in addition to the usual brake on the differential countershaft. The main clutch is of the cone type.

GORDON-BENNETT CUP RACE.—The first of the Pipe Cars to start in the Race on behalf of Belgium will probably be driven by Baron Pierre de Crawhez, who is deservedly popular in Belgium, and who has shown so much practical interest in the movement in that country. Baron de Crawhez is seen in our photograph on the car which he has undertaken to steer in the contest.

A few further particulars have come to hand concerning the three Fiat cars which have been built to represent Italy, and we are therefore able to supplement the information already given in our columns three weeks ago. The car driven by M. Cagno—who is the Queen of Italy's chauffeur—is seen in one of our illustrations this week, and it will be remembered that the drivers of the other two cars are MM. Lancia and Storero. These racers are, apparently, not unlike the celebrated 60-h.p. Mercedes cars in general design, and it will be noticed from our photograph, that the pressed steel frame projects some distance forward in front of the bonnet, so that the engine, and even the honeycomb radiator, are some distance behind the front axle; the bulk of the weight is, therefore, taken by the rear wheels. The four-cylinder engine, which is nominally of 75-h.p., has a magneto system of ignition, and the carburettor is fed under pressure from the petrol tank at the back. The power is transmitted from the differential countershaft to each of the rear wheels by side chains, and the change-speed-gear furnishes four forward speeds with direct drive on top speed. The flywheel forms a fan for drawing the air through the radiator, and the engine is, of course, completely closed in beneath. The wheel base is given as being 2·805 m., the track 1·85 m., and the tyres 910 mm. in diameter.

THE SELECTION OF BRITISH DRIVERS FOR THE GORDON-BENNETT RACE, 1904.

THE following letter was last week sent to Mr. S. F. Edge by the Executive Committee of the Automobile Club:—

DEAR SIR,—The Races Committee have considered your letter of the 30th ultimo, and have directed me to acquaint you that there is nothing in it which causes them to depart from the decision at which they arrived on Thursday, the 12th ultimo, which decision was come to on that day at the urgent request of the competitors themselves, and not later, as was previously intended.

This decision has now been confirmed by the Executive Committee. When your firm entered your car, also that driven by Mr. Earp and other Napier cars for the Selection Trials, with a view to the honour of representing your club in the race for the Gordon-Bennett Cup, you and they did so under the condition that the decision of the committee should be final.

From your letter it appears that you hold (on grounds for which there is no precedent in the history of the automobile sport) an opinion which is opposed to the unanimous decision of the committee. In consequence, you state that you would prefer, on what you term a "sporting" pretext, not to represent your club in the Race.

The committee can neither accept the views expressed in your letter, nor accede to your request to be relieved of the post for which you and your car competed, and which you gained, namely, that of being the club's first representative in the Race.

The Races Committee note that in the *Globe* of May 25th you are reported to have written a letter giving a practical reason for your wish to withdraw, namely, "not in any sense out of pique, but simply because it is a pure waste of time to take over to the German course cars which are at present entered second and third in the team, and which are unable to do 80 miles an hour at least under favourable conditions."

As no contradiction appears to have been made to this statement, and as the reason given differs so widely from the reason for your "sporting" disapproval, as set out in your letter of the 30th ultimo, they deem it expedient to take this opportunity of dealing with the point by stating that this must have also been an equally good reason against your going to Germany, even if Mr. Earp, by an unnecessary and most unjustifiable display of recklessness, had not broken up his car, and thus lost what might otherwise have been his place in the team. This will be apparent when it is stated that in the trial of Tuesday, May 10th, the records taken over the only portions of the course on which the cars were required to exhibit their highest speed, namely, the records of the times taken in making five ascents of the Snaefell Hill, five flying runs over half a mile on the flat, and five flying runs over three miles of straight road (representing altogether a total of about 30 miles) showed that the Wolseley cars driven by Mr. Jarrott and Mr. Girling were faster in each of these speed zones than the Napier car driven by Mr. Earp.

As has been stated above, the committee is not prepared to accede to your request to be relieved of your place in the team. They therefore must ask you to inform them by return of post whether you are prepared to fulfil the obligation resulting from your entry, and from your performances during the trials, or whether you refuse to drive as one of the selected team in the Gordon-Bennett Race.

Yours faithfully,
J. W. ORDE,
1st June, 1904. *Club Secretary.*

Mr. Edge's reply to the above communication, published below, was sent with promptitude on June 2nd. In sending us a copy for publication, Mr. Edge states that he will now do his best for the British Automobile Club, "although unfortunately I am still not in accord with their action."

Secretary of the Races Committee,
Automobile Club.

DEAR SIR,—I have your letter of the 1st inst., and I note that your committee still adhere to their decision *re* Mr. Clifford Earp. I note you state that the decision was come to immediately after the accident by the request of the competitors themselves. I assume you mean some of the competitors, and, as far as I can find out, the minority. I note that your decision has been confirmed by the Executive Committee.

In regard to your reference to my firm, they are quite aware that any decision of properly appointed committees dealing with any automobile question is final.

My firm have not raised any point with your committee on any question of decision.

My points have been raised purely as a personal competitor, and from no other point of view. I cannot see that because there is no precedent in the history of the automobile sport for my wishing you to reconsider your decision that that makes my action any better or worse, certainly I cannot follow your argument that it is detrimental to my action because I am the first to stand up for a competitor, who, it appears to me, has not been left in his proper place in the Gordon-Bennett team.

In regard to your reference to a newspaper, and my opinion expressed therein, I have not seen the paper in question, but my opinion still is that your committee are unwise to take any cars over to Germany, representing this country, which cannot, under favourable conditions, do eighty miles an hour.

As you rightly say, this may be a very good reason for my not going to Germany, except that I am in a position to prove to your committee that my car can exceed eighty miles an hour under favourable conditions.

I thank you for your information in regard to the various times by different competitors on the Tuesday Manx Trials, and I would suggest that if your committee publish fully all the times done on the day in question, it may possibly make their action more clear than it is at present.

In regard to my taking my place in the selected team for the Gordon-Bennett Race, under no circumstances would I refuse to do this, unless ill-health or some other reason over which I had no control prevented me; and as your committee's letter, although somewhat involved, seems to clearly refuse me permission to withdraw, I accept your ruling, and will at once make preparations to do everything possible, as far as myself and my car are concerned, to assist the other two members of the team, so that the three of us may put up the best possible fight for Great Britain in the Gordon-Bennett Race.

Yours truly,
S. F. EDGE.

THIS week between 30 and 40 new members have been elected to the Automobile Club, amongst those who have joined being the Duke of Beaufort, Sir Thomas V. S. Gooch, Bart., Professor A. Barr, Sir S. H. Waterlow, Bart., K.C.V.O., Lord Moreton, Capt. James R. Mitchell, the Rev. Charles Prodgers, the Marquis of Northampton, Col. the Hon. J. H. G. Byng, Sir Reginald Cathcart, Bart., and Mr. Waldorf Astor.

UNDER the auspices of the Chicago Automobile Club last month an automobile parade was organised. About 228 vehicles took part officially, and about 100 stray cars joined, en route, and added to the length of the line. A route was mapped out, of about eight miles, which occupied a little over an hour to cover. The idea was to demonstrate generally, to the public, the growth of automobilism in the city, and to give a practical lesson to the municipal authorities of the extreme ease with which motor cars can be negotiated in ordinary traffic. Mayor Harrison, and Mr. H. G. Forman, President of the South Park Board of Commissioners, and a number of the city aldermen, were prominent passengers and guests of the club. The regularity of the procession, unfortunately, was greatly interfered with by the general traffic, and was thereby rendered less imposing than was contemplated.

THE "FORD" PETROL CAR.

THE success that has attended the introduction of the well-known types of light American cars to this country has induced yet another manufacturing house in the States to appoint agents over here for bringing their handy little vehicles before the notice of the British public. The newcomer is the production of the Ford Motor Company, of Detroit, a city in the State of Michigan which has rapidly grown of late to be the "Coventry" of America, and where there are now quite a considerable number of huge factories busily engaged in the manufacture of motor cars; and this vehicle is being sold in Great Britain by the American Motor Car Agency, of 117, Long Acre, W.C.

The Ford car is somewhat similar in the general arrangement of its parts, and in the type of transmission gear that is employed, to the other American petrol cars which are already so well known and appreciated over here. It has, however, many interesting and distinctive features, and the engine is more powerful than on most of the other cars of a similar kind. To begin with, the engine has two horizontal cylinders instead of one, and they are placed on opposite sides of the crank-chamber so as to give an impulse at a similar time during each revolution, and a very satisfactory mechanical balance of the moving parts. The two forward speeds and the "reverse" are provided by a combined epicyclic gear and clutch mechanism that is mounted on the crank-shaft, and the end of the crank-shaft—outside the gear—is supported by a third bearing which is rendered rigid with the engine by an independent framework fixed to the chassis frame. An interesting feature of the epicyclic gear is that no internally-toothed gear-wheels are employed in it. Another striking characteristic of the chassis is its simplicity of appearance, this effect being partly produced by the compact arrangement of the engine with the gear and the supply tanks as a separately detachable unit, which is centrally arranged in the car. The method of suspension adopted consists of the employment of double elliptic springs, at each side, above both axles. The rear springs are pivotally connected to the frame, and are so attached to the axle that the latter can be moved bodily forward or backward beneath them when it is necessary to adjust the driving chain. These rear springs, too, are reinforced by an inverted transverse spring which acts as a check-spring, and has its ends resting upon the centres of the side-springs. Steering is effected by a wheel mounted upon an inclined pillar, and there is a direct system of levers and rods to connect it with the steering-heads. The standard bodies on these vehicles are of the detachable tonneau type which has now become so popular in America, although a Ford car is also supplied as a two-seater for those who do not require the additional accommodation furnished by the tonneau. Ample power is provided for enabling the car to travel at a high average speed even when carrying its full complement of passengers, and, like most of the light cars that are built in the States, the vehicle runs very comfortably even on very rough roads, and is normally remarkably silent. The actual power available from the comparatively slow-speed engine is about 10-b.h.p. The engine is primarily controlled by a foot-pedal acting upon a throttle-valve, although the time of ignition is variable by a hand-lever on the steering-pillar. Like other cars of its type it is particularly easy to drive, and is very handy to manage even in the thickest traffic.

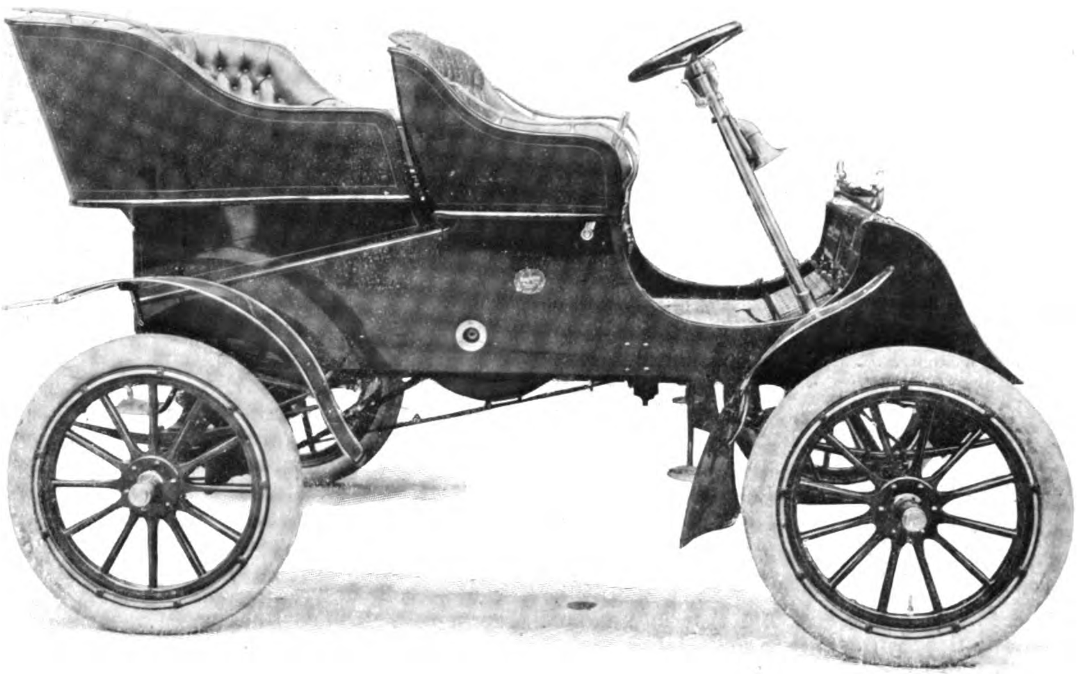


FIG. 1.—Side View of the "Ford" Petrol Car, fitted with Tonneau.

With these preliminary remarks concerning the Ford car, we will now proceed to deal with the construction of this interesting little vehicle in somewhat greater detail, and for this purpose shall refer to the illustrations which we have prepared from photographs which we have taken. Fig. 1 shows a complete vehicle fitted with

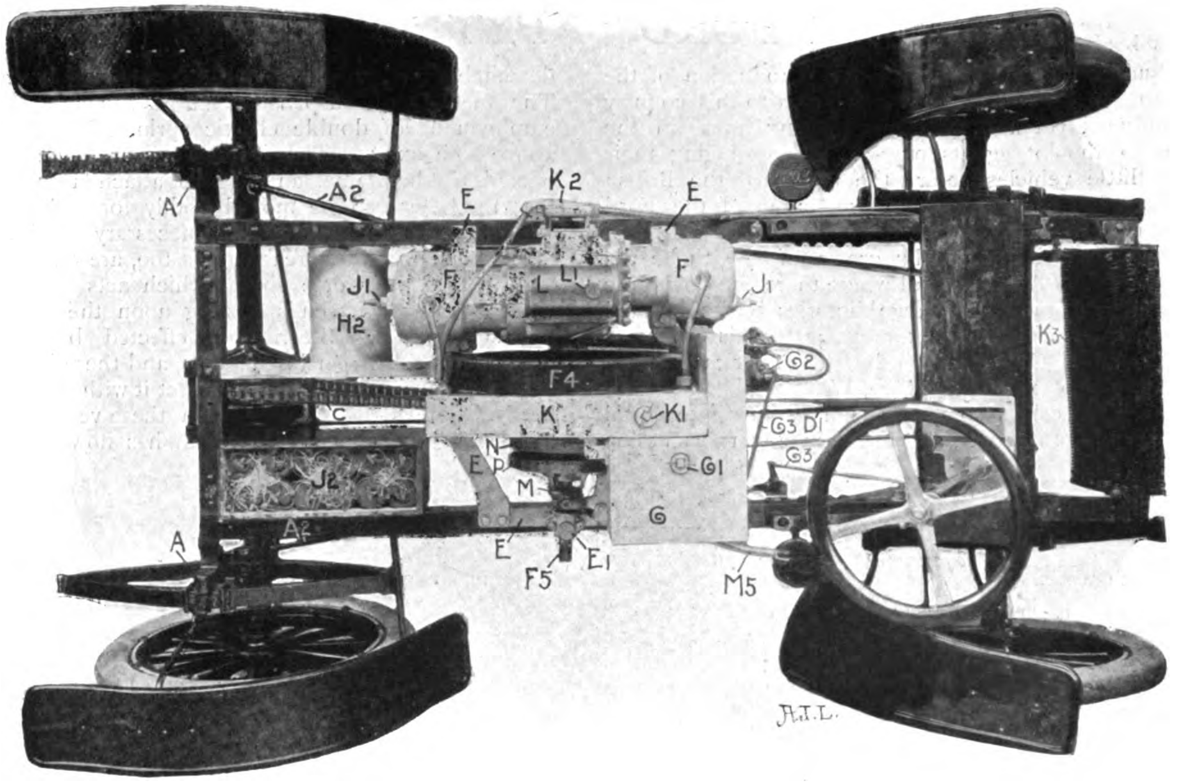


FIG. 2.—View of the "Ford" chassis, from above.

its tonneau, and with detachable "Fisk" tyres instead of the single tube tyres usually employed. This particular body is, it will be noticed, fitted with brass rails around the backs of the seats and across the front of the car, but these do not form a part of the standard equipment. The construction of the chassis and the arrangement of the entire driving mechanism is seen in Figs. 2, 3, and 4, which are respectively views from above, from beneath, and from the rear. In Fig. 2 the lid of the battery box has been removed to show the cells, and it should further be pointed out that in none of these three illustrations is the change-speed lever, or the spark coil, visible, because they are fixed to the body.

The main frame is of simple rectangular shape, with the side and rear members formed of angle iron, 2 ins. by 2½ ins. The side members are joined together in front by a flat bar placed edgeways, and are considerably stiffened also by the radiator, which is bolted across their extreme ends. There are also light longitudinal members for giving the necessary stiffness and support to some of the other parts. The entire frame is riveted together, and—as seen in Fig. 4—its rear corners are formed by specially-shaped brackets, A, which project outwardly, and terminate in pins that serve as fulcrums for the springs to be pivoted to. These rear springs, as also those in front, are of the full elliptic type, and they are arranged somewhat unusually. The front springs form the only connection between that axle and the frame, and they are secured rigidly, above and beneath, to these parts. The back springs are not only hinged to the frame at the top, as we have seen, but the brackets to which they are clipped, on the underside, are secured to the axle in such a way that the chain, C, can be tightened, although the hinged radius rods, A^2, that pass from these brackets up to the side members of the frame are simple forgings, and are consequently non-adjustable as regards length. For this purpose the spring brackets have flat undersurfaces that fit against corresponding faces on the axle, and the holes through which the studs, A^1, pass in them are slotted, as can be seen in our illustration. The spring brackets are also fitted wlth tightening screws, A^4 (Fig. 3), so that, after the four nuts on the studs, A^1, have been slackened, it is possible to force the axle bodily backwards by screwing up the bolts, A^4, or to allow it to move in the other direction (to slacken the chain, C) by unscrewing the bolts, A^4. The transverse spring, A^3, also takes a part of the weight of the car, when fully loaded, or when it is travelling light over very rough roads; this spring is fixed at its centre to the

A	Corner brackets of main frame.
A^1	Studs securing spring-bracket to back axle.
A^2	Radius rods.
A^3	Transverse spring.
A^4	Tightening screws.
B	Rear axle spider brackets.
B^1	Tie rods.
B^2	Connecting pins.
C	Main chain.
D	Internal brake-drum.
D^1	Rod operating brake.
D^2	Brake pedal.
E	Frame for engine and gear.
E^1	End bearing for crank-shaft.
F	Cylinder castings.
F^1	Lower crank-chamber casting.
F^2	Upper crank-chamber casting.
F^3	Cover plate.
F^4	Flywheel.
F^5	Pin for starting handle.
G	Petrol tank.
G^1	Filler.
G^2	Carburettor.
G^3	Rods connecting throttle-valve with foot-pedal.
G^4	Induction-pipe.
G^5	Inspection-plugs for inlet-valves.
G^6	Inlet-valves.
G^7	Pedal controlling throttle-valve.
H	Inspection-plugs for exhaust-valves.
H^1	Exhaust-pipe.
H^2	Exhaust-box.
H^3	Exhaust-valves.
J	Commutator.
J^1	Ignition-plugs.
J^2	Batteries.
J^3	Battery box.
J^4	Two-way switch.
J^5	Safety-plug.
J^6	Timing-lever.
K	Water tank.
K^1	Filler.
K^2	Pump.
K^3	Radiator.
L	Engine lubricator.
L^1	Filler.
M	Sliding clutch cone.
M^1	Clutch-plate.
M^2	Toggle-levers.
M^3	Bell-crank.
M^4	Rock-shaft.
M^5	Operating rod.
M^6	Change-speed-lever.
N	Low-speed brake-band.
N^1	Cam-operated link.
N^2	Adjustment-screw.
P	"Reverse" brake-band.
P^1	Rod operating "reverse."
P^2	"Reverse" pedal.

Table of Reference Letters for the "Ford" Car Illustrations.

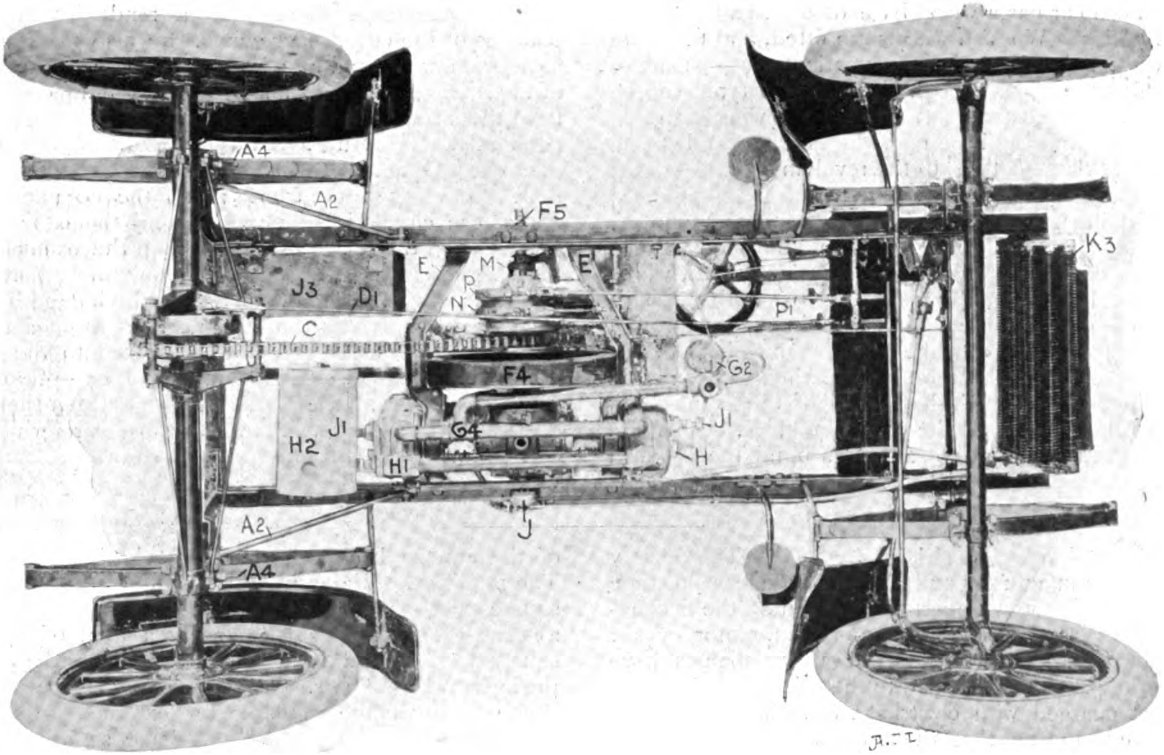


FIG. 3.—View of the "Ford" Chassis, from beneath.

frame, and its ends merely rest upon the side-springs, as seen in Fig. 4.

The live-rear-axle is almost identical in construction with that on another light American vehicle which was described at some length in our columns a short time ago. The stationary portion consists of steel tubes, inside which run the revolving shafts in their roller-bearings. These two external tubes are connected together, about the differential gear, by the spiders, B, and the steel pins, B^2, while the entire axle is stiffened by the diagonal tie-rods, B^1. On this car, the differential gear is of the bevel type, and to its shell are fixed the large sprocket-wheel by which it is driven through the chain, C, and the internal brake-drum, D. The main driving-chain, C, is of the roller type, and the brake, D—which is the only brake acting direct upon the axle—is operated through the rod, D^1, by a foot-pedal.

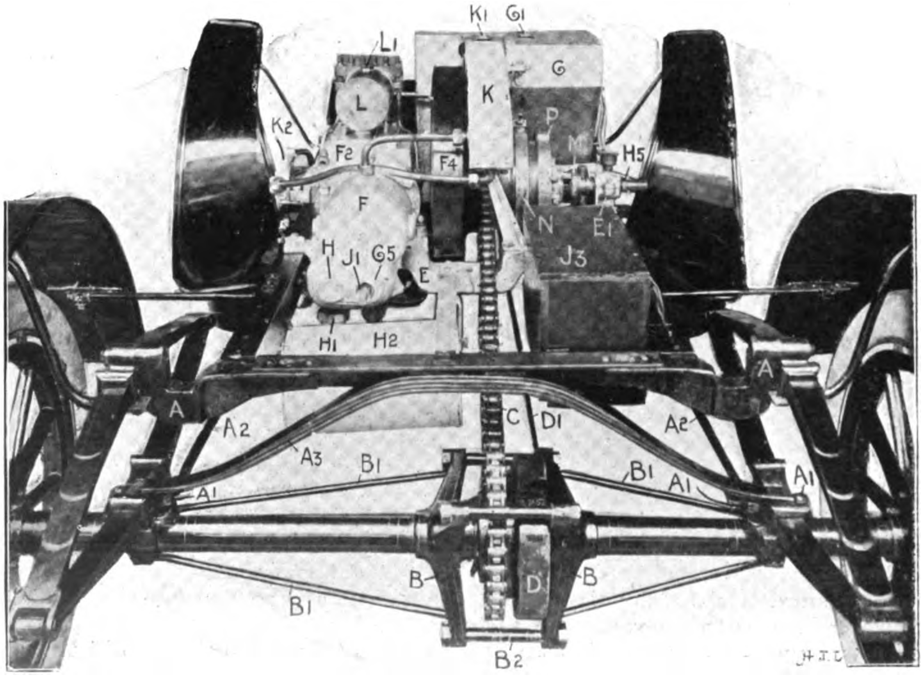


FIG. 4.—Rear View of the "Ford" Chassis.

The front axle is formed by a straight tube, to the ends of which the brackets supporting the steering heads for the front wheels are fixed; these brackets are of the bifurcated type, supporting the heads both above and beneath. Steering is effected through a simple system of levers connecting the base of the inclined steering pillar with the steering heads, as seen in Fig. 3. The lever-arm which is fixed to the bottom of the pillar has a ball-joint at its end to allow for the free play of the front springs. The steering mechanism is of somewhat light construction, and no attempt has been made to render it irreversible.

The Ford car has a wheel base of 6 ft., and the track is 4 ft. 7½ ins. Wooden wheels are fitted, and these are shod with 28 in. by 3 in. pneumatic tyres—usually of the single tube type, though double tube tyres can be fitted at a small extra cost. The front wheels run on ½-in. ball bearings, and the rear wheels are securely fixed, by keys and large cottars, to the revolving shafts—which latter are 1⅛ in. in diameter.

The engine and the change-speed-gear are mounted, with the flywheel lying between them, almost exactly in the centre of the car, on a separate framework, E, which is composed of three castings bolted to another. This framework, of which the engine itself in reality forms a necessary part, is fixed to the two side members of the main frame, and it has an outside bearing, E^1, formed in it for supporting the right-hand end of the crank-shaft. The petrol tank, G, and the water tank, K, which are both of peculiar shape, so as to fit around the flywheel and the change-speed-gear without rendering the vital portions of the latter inaccessible, are also fixed to the same framework, and thus it is that practically the whole of the driving mechanism can be removed in one piece from the chassis, and can be run and tested quite independently. The tanks, G and K, have their respective filler caps, G^1 and K^1, placed so that they can be got at easily, by lifting up the front seat on the complete car, and as the circulating pump, K^2, and the carburettor, G^2, are fixed direct to the engine—and the exhaust-box, H^2, is fixed close up behind it—the only pipes that have to be disconnected when removing the driving mechanism from the chassis are those which pass forward to the radiator, K^3. The battery box, J^3, is fixed to the main frame on the right side at the rear, and, except for the steering pillar and the foot-pedals—of which there are three—we have now mentioned all those parts which are carried on the main frame.

(*To be continued.*)

Carriage of Motor Vehicles by Rail.—The Society of Motor Manufacturers and Traders have for some time had in hand the very important question of the declaration from the consignees of motor cars, motor cycles, and motor boats, which the railway companies have hitherto required to be signed to the effect that the same were not charged with electricity, &c. This has been interpreted to mean that the ignition batteries must be removed before transit, thereby causing great inconvenience; and further, the railway companies were requiring a form of indemnity of so wide a character as to throw practically unlimited responsibility upon the consigner in the event of any damage, &c. A deputation from the society waited upon the railway managers in February last with regard to these matters, and also with regard to the rates of carriage for motor vehicles, and the protection of such vehicles in transit, when not conveyed in covered trucks.

The society has now been notified that, as from June 1st, the form of declaration and consignment note in question will be modified in such a manner as to remove the objections complained of, and also that arrangements are already in operation whereby motor cars conveyed by goods train are properly protected.

With regard to the question of rates of carriage the railway companies regret that they do not see their way to make any alteration in the existing arrangements, but, under the circumstances, the concessions obtained as above can probably be considered satisfactory.

THE Society of Motor Manufacturers and Traders having finally decided to hold their next exhibition at Olympia, Kensington, instead of at the Crystal Palace, have determined to offer a prize of 10 guineas for the best design for a poster for the show, which will open in February next.

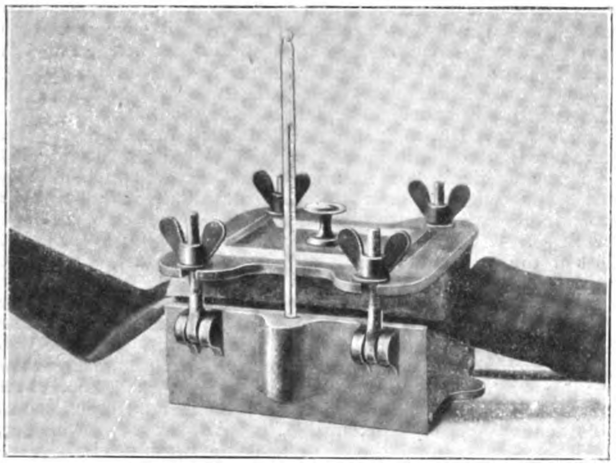
ALREADY the applications for space which have been received by the Society have nearly absorbed the whole of the floor space which will be available for exhibits, and in all probability many late applicants will find themselves left out of the next official Exhibition of the Society. A very notable increase in the exhibits in the heavy vehicle section is assured, and motor boats will constitute a strong feature of the Exhibition, a portion of the annexe being reserved for this class of exhibit. The total area of the ground floor of Olympia is 110,000 square feet, the gallery 46,000 square feet, and the annexe 18,600 square feet, giving a total of 174,700 square feet. In addition there is the minor hall comprising two large floors. Of the gross floor space 100,000 square feet will be available for exhibits, which will allow a considerable extension of large stands to many of those who have hitherto had to content themselves with a less-sized space than 800 feet. Tyres and accessories will be located in the gallery, the ground floor of the main building being devoted entirely to motor cars, with the heavy vehicles and agricultural motors grouped at one end. Machinery and tools will probably be shown in a separate section by the side of the motor boats. It is announced that by the time the Exhibition opens in February next the electrification of the Underground Railway will have been completed—a very important point in favour of the Exhibition at Olympia.

ON Friday of last week, the 20-h.p. Spyker car, which we described in our last issue, started for a week-end tour round the South Coast, driven by Mr. A. E. Perman. Our illustration on page 717 shows the vehicle just prior to leaving the Locomobile Company's garage, shortly after mid-day. After travelling to Margate, and all along the coast through Dover, Folkestone, Hastings, Eastbourne, Brighton, Portsmouth, Southampton, Bournemouth, Bridport, Exeter and Teignmouth, Plymouth was reached—making a distance of 432 miles—in good time on Saturday. Unfortunately, Mr. Perman was compelled to place himself in the doctor's hands at Plymouth, suffering from a touch of sunstroke, or otherwise he had intended to continue the tour over Sunday. In spite of the hilly nature of much of the country traversed, no trouble of any kind appears to have been given by the mechanism, with the solitary exceptions of replacing a contact blade in the commutator and a belt that drives the fan. The tyres, too, which were of the Dunlop non-slipping type, seem to have behaved admirably, although one of those on the driving wheels sustained a puncture caused by a 3 in. nail penetrating the cover and the tube. The car was driven back to London (250 miles) on the following day, Mr. Perman, however, having to return by train.

SOME USEFUL IMPROVEMENTS.

The G.B. Portable Vulcaniser.

OUR illustration represents a novelty for the repair outfit of a motor car in the shape of a portable vulcanising plant for the repair of inner tubes. This diminutive apparatus consists of an iron box slightly concave on its upper face, and provided with a sliding bottom for the insertion of the "heater," which takes the form of a block of iron previously raised to a red heat by any convenient means. The process of repairing an inner tube is as follows:—The patch is stuck on over the damaged portion with specially prepared "solution," and is then held down against the concave face of the vulcaniser by means of a flat plate and thumb-screws. A thick rubber pad and shaped wooden block are packed between the top plate and the tyre so as to avoid damaging the latter. The vulcaniser has, of course, been previously raised to the required temperature, as indicated by the thermometer seen projecting from its pocket in the side of the box, and the inner tube is retained in place for a period of about ten to fifteen minutes. This device has been placed on the market by the County Chemical Company, Limited, at a moderate price, which includes spare patches, solution, and other sundries. To those who prefer to make repairs of this nature themselves, and to try their hands at the art of vulcanising rubber, this apparatus is bound to appeal.

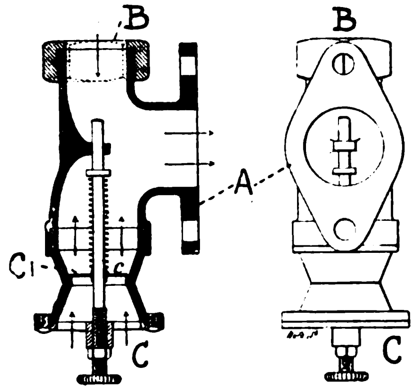


The A.V. Sparking Plug.

The A.V. sparking plug, a photograph of which we reproduce above, has been recently introduced by the United Motor Industries, Limited. The principal feature of interest in this plug lies in its spark points. On the "earth" side this consists of a small bar bridging the inner end of the plug proper, into the metal of which it is firmly caulked. This arrangement ensures considerable strength, and also renders the liability to accidental breakage extremely small, since neither of the spark points project beyond the metal of the plug. Following recent practice in the design of sparking plugs, the porcelain in the A.V. is cut well back in order to reduce the tendency to short circuit by carbonisation, and to leave a chamber through which the gases may surge and keep the sparking terminals clean.

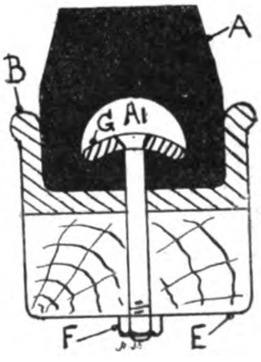
The Longuemare "Automatic" Carburettor Attachment.

In order to render the Longuemare carburettor "automatic," an additional valve fitting has been introduced for use with the maker's standard types. It consists, as seen in Fig. 1, of a small "T" pipe for fixing by the flange, A, to the main air-inlet flange of the carburettor. The main air supply enters unrestricted at B, and a varying supply of additional main air is admitted, at higher engine speeds, through the branch pipe, C. The pipe, C, is closed by the spring-controlled valve, C^1, which opens in accordance with the increased suction. For the smaller types of carburettor, such as those used on motor cycles, a somewhat modified form of the same device is used, the valve in this case being introduced in the passage through which the whole of the main air enters. Samples of these attachments were exhibited by the United Motor Industries at the Shows this year.



The "Grip" Tyre.

The design of solid rubber tyres suitable for ordinary motor vehicles is at the present time occupying the attention of a good many people, and the latest design which has come before our notice is the "Grip" tyre, the invention of Mr. J. W. Burt. Our illustration represents a section through the "Grip" tyre, and in this A is the solid rubber tyre, which is formed with a flat tread, and is hollowed out in the centre to leave a space, A^1. Partly filling this space is a steel band, G, which may be inserted in sections of any desired length, each section being previously bent to the required curvature. Bolts with countersunk heads, F, are arranged at intervals round the steel band, G, and these pass right through the channel rim, B, and the felloe, E. Mr. Burt claims that his tyre possesses considerable resiliency owing to the air chamber, A^1, and that he is able to get great security of the tyre in the rim without placing the side walls of the tyre in compression, and so reducing their resiliency in the place where it is most wanted. Simplicity of effecting repairs is also put forward, because of the possibility of inserting a new length of tyre in place of a damaged portion without removing the whole of the tyre from the rim.



THE MOTOR CAR FOR SOUTH AFRICA—WHAT IS WANTED.

(By "Maritzburg" and D. W. Gawn.)

THE peculiar requirements of the automobile buyer in South Africa are such as to deserve the closest attention of the manufacturer. The market, a fast-growing one, is likely to become very large in the immediate future, and one which should be especially suited for our own capabilities. That is to say, the type of motor pleasure vehicle mostly in request will, probably, be that so characteristic of British builders—the solid, durable, and simple article. It is the long-distance touring car rather than the "run-about" which will be called for. And in using the term "long-distance" here, much more is meant than it commonly implies. Distances from habited place to place are so vast in the Colonies as compared with what obtains at home that any motor car of the denomination referred to must, if it is to adapt itself successfully to the altered circumstances, be itself correspondingly modified. Bases of supply are wide apart indeed. Towns are few and far between, and only in the more important of them is it possible even to replenish the fuel tank. As for "spares," they can be obtained by sending to England, to France, to Germany, or to America, but not elsewhere nearer.

These notes are based upon actual experience extending over some years of automobile practice in Natal. What is to be said will apply with almost equal force to other parts of South Africa. It is thought that our remarks may indicate a line along which makers and agents can work with advantage. Certainly, by noting the conditions under which a car has to run, they should be the better able to send out the right thing. On that head there is this much to be said: The Colonial motorist, like his brother at home, will favour the car which gives him least trouble. Because it has been popularly believed that he is capable of enduring with equanimity any amount of "roughing," it must not be assumed that he will take kindly to an automobile roughly or unsuitably constructed. He will appreciate heartily any effort to meet his needs, and will pay lavishly for that which fulfils them.

There are few features of South Africa more striking to the visitor than the nature of its roads. Generally, the term can be applied as a courtesy one only. Outside the towns they are mere tracks. Originally, in places, they may have been cut for their purpose, but it is more reasonable to suppose that their greater length was "engineered' by a long and various succession of waggon traffic alone. By that means, it is certain, they are principally maintained. The surface is a loose mixture of sand and rocks. When dry, it is easily raised and fills the air with a penetrating dust—a dust which is hard and abrasive. Wet, it is clinging and heavy. In parts, ditches are cut *transversely* at frequent intervals. These are necessary to arrest the rush of water during the rains and prevent "wash-outs." Combined with deep ruts formed by waggon wheels and a fairly perfect disintegration by the countless hoofs of draught cattle, a road is presented which does not invite speed. Gradients are not slight. They require careful negotiation, some being positively formidable. Where a road pursues its course through a mountainous district, it is naturally of a sinuous character; and many of the bends are sharp. One finds this particularly on the Durban-Maritzburg route in the neighbourhood of Inchanga and Botha's Hill. The road runs for some distance nearly parallel with the railway, but at a considerably higher level. Its curves are acute, its grades steep and its surface is of the roughest. A false motion of the steering hand would probably land one in a state of splinters either upon the railway or, on the other side, down into a kloof. It is such roads as this which emphasise the absolute necessity of irreproachably sound steering gear.

To illustrate the requirements in the way of transmission gearing, or in the greater elasticity of engine power, the following may be cited. On a recent run from Boston to Maritzburg, approximately 27 miles, it was needful to change gear no fewer than 170 times. The car was an up-to-date, twin-cylinder, 10-h.p., one of German manufacture. The distance was covered in rather more than two hours, that time constituting a "record," and one, let it be said, which will not be readily beaten. Cars geared for high speeds are not wanted in South Africa. It is impossible to drive even moderately fast over ruts and boulders, or around such curves as there present themselves. A car geared for perpetual hill-climbing is the car that goes farthest on Colonial roads. It is, too, the least wearying for its driver and for itself. When it becomes imperative to pedal the clutch and to change gear continuously, the lives of the car and the chauffeur may be said to be perceptibly on the wane. And, although geared thus low on the top speed, it is not the less desirable to provide four changes. These, and the reverse, should be actuated by a single lever.

To be successful, an automobile for the Colonies must be more than usually substantial in build. Yet its weight should be comparatively light. Indeed, it should be reduced to a minimum, providing always that the working parts are adequately proportioned. If this is not done, ordinary springs and axles may fail miserably. The jolting and bumping to which a car is subjected is terrific. With a view to minimise the effects of these shocks in running, the wheel-base ought to be long. Pneumatic tyres are essential, too, towards the same end. With regard to the wheels themselves, it is questionable whether the fashionable artillery type is altogether the best. Wire suspension wheels are far lighter, and are more capable of withstanding torsional strains. In a climate, also, where wide ranges of temperature and humidity are experienced, wood is liable to suffer much greater harm than metal.

Fashion may be questioned, again, in its dictates, as to the height of a car. When high speeds are not feasible, there is no advantage whatever in pitching the centre of gravity so low as is now general. In fact, there are disadvantages. Home motorists have had occasion at times to drive through flooded stretches of road. We believe that it has happened more than once that cars have been brought up like artificial desolate islands owing to wet "shorts" in their electrical economy. On a higher-built car the water could have caused no such trouble. In South Africa, it must be remembered, there are drifts to be crossed. If a car be hung very low it is a sporting chance whether it will make the opposite side of one without the aid of a friendly team. The average depth of water is a mere trifle, it is true; but, as the bed usually is uneven and rocky, splash and surge is inevitable in crossing, and the natural consequence may be a general failure of the electrical circuit. There is, too, another and really dangerous drawback. The front axle, if very near the ground, may strike upon a piece of rock and bring about complete wreckage. It were better, perhaps, for the designer to adopt the lines of the greyhound rather than those of the basset, of which he appears too fond.

Referring more particularly to the electrical equipment, the magneto system is to be favoured. Dry batteries are useless because of their ephemeral nature. Accumulators would be well enough could they be charged with facility. That, however, is not possible excepting in one or two of the larger towns. Materials for making and maintaining a small battery for charging on one's own account are practically unobtainable. Apart, moreover, from that, there are certain possibilities in accumulators which can be appreciated only in the midst of civilisation. In a country possessing but patches of it, unexpectedly exhausted cells will leave open one course—that of abandoning the car they are fitted in until the deficiency can be made good. But, in recommending the employment of the magneto, we would ask our readers to observe that a thoroughly practical, perfectly working magneto is meant. A vivid recollection of the obverse is brought to mind. It occurred late last year during a run some dozen miles outside Natal's capital. The machine was of the familiar reciprocating pattern, and was part of the German car already mentioned. The stroke of the actuating crank had been made a trifle too long. There being, consequently, no clearance between the stop-pins at the other end of the connecting rod, these were sheared off. A moment later and the whole thing fell into a collection of component parts. It will hardly be credited that they were re-erected, made fast with whittled wooden pegs, and so used to work the car home. Yet it was so and, as a "roadside repair," it probably stands unique.

A rotary type of magneto on the high-tension principle is, perhaps, preferable. Its driving cannot cause trouble, and it will permit of ordinary sparking-plugs being employed.

All brake gear and sprags must be of the highest possible strength and efficiency. The brakes should be, of course, double-acting, and amply powerful enough to hold the car, fully loaded, on grades of 1 in 6-4. Such tremendous slopes may be encountered when least looked for, and a failure of brakes would be disastrous.

In connection with the cooling arrangements, a few words will suffice. Adequacy should be the keynote for the designer. Water is often difficult to procure, and a car should, therefore, carry a supply sufficient for very long runs. The radiator must be efficient. It should serve to keep the water well below boiling point—unless condensation can be effected—so that loss by evaporation may be small. The temperature of the atmosphere is frequently as high as 110 degrees Fahr. in the sun, and sometimes as high as that in the shade. This must be taken into consideration. A fan to induce draught over the radiating surface is practically indispensable. As has been said, high speed is impossible, and, consequently, natural currents of air are insufficient to dissipate the waste heat. This was demonstrated most forcibly only a few weeks ago. A car had been driven a distance of but five miles when it was found that the water tank had become exhausted. On pouring in a fresh supply, it hissed and boiled furiously on reaching the overheated cylinders, and some apprehension was entertained for their safety.

The fuel tank, also, must be of ample capacity. For general purposes, no car should be sent out with a tank which is incapable of holding fuel for 150 miles at least. If it is larger, so much the better. It must be assumed that the throttle will be open wide on the longer portion of that distance.

A generous assortment of spares ought to accompany every machine exported. This should include many parts not ordinarily considered spares. Any fitment upon which much wear devolves, or on which depends perfect running, should have its duplicate in the locker. The initial cost of these additions will not be objected to. Experience has proved that renewals and repairing effected locally represents far greater expense. One car, for example, has cost its owner little short of two pounds weekly during several months for sundry tinkering. The fact that he is not yet tired points a moral which makers can see for themselves, and may well take to heart.

Want of space prevents us saying more here. Should any reader desire further information, whether for commercial or private purposes, he can be put directly in communication with the writers of this article.

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PROPOSED INSTITUTION OF MOTOR ENGINEERS.

THE following report with reference to the proposal to found an Institution of Motor Engineers was recently presented to the Automobile Club Committee by the Technical Secretary :—

In accordance with instructions received from the club committee, I have now examined the scheme proposed by Mr. Marshall for the foundation of an institution for motor engineers, and find that many of the points which he suggests are already covered, either by the work of the club or by that of the various technical colleges. Without taking his points in detail, I think that nearly all of them can be met by inducing the professors of the various colleges to deal more directly with motor engineering, although, of course, the greater part of their lectures dealing with engineering generally will be as suitable for a man going in for motor engineering as for any other branch of the profession.

The only suggestions I have to make are that it might be possible to find a room in the club wherein various patent specifications referring to motor matters might be filed and indexed, and a special clerk might be engaged to study the specifications as they come out, and to select and catalogue all those belonging to this question, and access might be had by outsiders on payment of a small fee. It may further be possible to throw open the lectures, which are now held on Thursday nights, more widely to guests, or to "lecture members" of the Automobile Club, who would pay some small annual fee for the privilege of attending; then, perhaps, professional men and others might be secured for a fee to read a course of lectures, which would be arranged systematically.

It appears that all the rest of the ground will be fully covered by the work which the club has been carrying out in connection with trials, &c., and is on the point of carrying out with the brake test instrument and the plant for testing carburettors, ignition, &c., and there scarcely appears to be room for a separate institution in addition.

It has been suggested that certificates of efficiency might be granted by the club. As far as I can see, this could only be (1) for driving; (2) for mechanical knowledge and efficiency. The club has already decided that certificates for driving cannot be granted, and the present technical colleges ought certainly to be the best authorities for the granting of certificates on mechanical knowledge.

Mr. H. Austin, the president of the Automobile and Cycle Engineers' Institute, writing upon the same subject, points out that the "Automobile and Cycle Engineers' Institute" is already in existence, and carrying out the objects proposed to be accomplished by the proposed institution. He continues :—

For some years now this Institute has done good work in the interests of, and for, the profession of cycle engineers, but at the last annual meeting the council of the Institute, having realised that a great number of its members were associated with automobile engineering, recommended that the title be altered so as to include the profession of automobile engineers. This suggestion met with the unanimous approval of the meeting, as was announced in the various Press notices, and as a result applications for membership are being received daily, and will be dealt with at our next council meeting. In view of the foregoing, I cannot help thinking that a "proposed" Institution of Automobile Engineers is unwarranted and therefore quite unnecessary.

AERONAUTICS.

"THE BEST INCLINATIONS FOR THE SURFACES AND PROPELLER SHAFTS OF DYNAMICAL AIRSHIPS."*

THE subject of this paper is treated from a mathematical and theoretical standpoint, and its object is to show the considerations affecting the efficiency, under assumed ideal atmospheric conditions, of a "dynamical airship"—or aeroplane—as relating to the angle at which the aeroplane itself is set, the inclination of the propeller shaft which is used to drive it, and the effect of varying the "windage," or area of the framework, engine, &c., which form the essential additional portions of such a machine.

As the deductions are theoretical ones, it will, perhaps, be as well to enumerate herewith three assumptions which will be made throughout. The first of these is that :—

The thrust of the propeller does not appreciably vary for different velocities of the machine as a whole, when its velocity lies within certain limits.

The second assumption is that :—

The thrust of the propeller is not appreciably altered by the fact that the shaft may not be parallel to the direction of motion.

The third assumption is that :—

On a good surface there is no perceptible tangential force or skin friction.

Marine engineers might advance against the second assumption the case of inclined propeller shafts at sea, where they produce so much vibration; the case, however, is not altogether analogous, and under these circumstances may be classed as a constructional difficulty.

Having made these assumptions for the purposes of this paper, it is now necessary to apply some not very advanced mathematics to the analysis of the forces at work on an aeroplane, in order to see how the case may be simplified, and what curves or tables can be prepared which shall enable the probable effect of varying one factor or another to be seen at a glance.

As an aid to fixing ideas, the diagram, Fig. 1, has been prepared, which shows the forces acting on an aeroplane which is inclined at an angle to the horizontal. Beneath this is a list of symbols which will enable ready reference to be made in order to find the significance of any particular letter.

There is an important practical point, which it may be as well to mention here, in connection with the "effective area" of the aeroplane which is represented in the above table by the letter "A." With planes of about 1 foot in depth the effective area will be equivalent to their true area, while for planes of less than 1 foot in depth the effective area will be greater, and for planes more than 1 foot in depth the effective area will be less than their actual area. Bearing this fact in mind enables the equation

$$\text{(i.)}\ R = P\,\alpha\,AV^2$$

to be read in its right light.

The other direct equation which we may write down at sight is:

$$\text{(ii.)}\ r - P90\,aV^2\,;$$

but here again the real value of "a" is a factor not easily definitely determined.

The framework of such machines is mostly of wire and tube formation; now the area of any such elemental tube, so far as its resistance to the air is concerned, is less than would be obtained by multiplying its effective length by its diameter. The true face area thus obtained must be multiplied by a constant which is variously given by authorities treating similar structures when withstanding wind-pressure.

Mr. B. B. Stoney, in his "Theory of Stresses," gives the value of the constant as being one half, when the framework is of sufficiently open construction (it may in any case, however, be taken as not more than two-thirds the actual area).

For equilibrium or steady motion of the machine, the equations to be formed are obviously :—

$$\text{(iii)}\ T \sin\beta = W - R\cos\alpha \text{ (Vertical Component).}$$

$$\text{(iv)}\ T \cos\beta = r + R\sin\alpha \text{ (Horizontal Component).}$$

Thus in the first of the above equations $T \sin\beta$ is the upward thrust of the propeller, and $R \cos\alpha$ is the upward thrust of the air on the aeroplane. If these two added together are equal to "W," the weight lifted, then there is vertical equilibrium or no tendency to rise or fall. In equation (iv), $T \cos\beta$ is the horizontal forward component of the force of the propeller, while $R \sin\alpha$ is the horizontal backward thrust of the air on the aeroplane and r that of the air on the framework: thus $R \sin\alpha + r$ together represent the

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* Excerpt of a paper read by Mr. T. W. K. Clarke, before the Aeronautical Institute, on May 31st.
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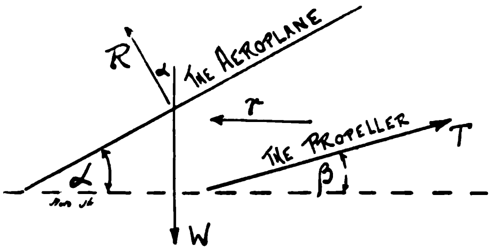


FIG. 1.—Diagram indicating the various forces acting on an aeroplane.

LIST OF SYMBOLS.

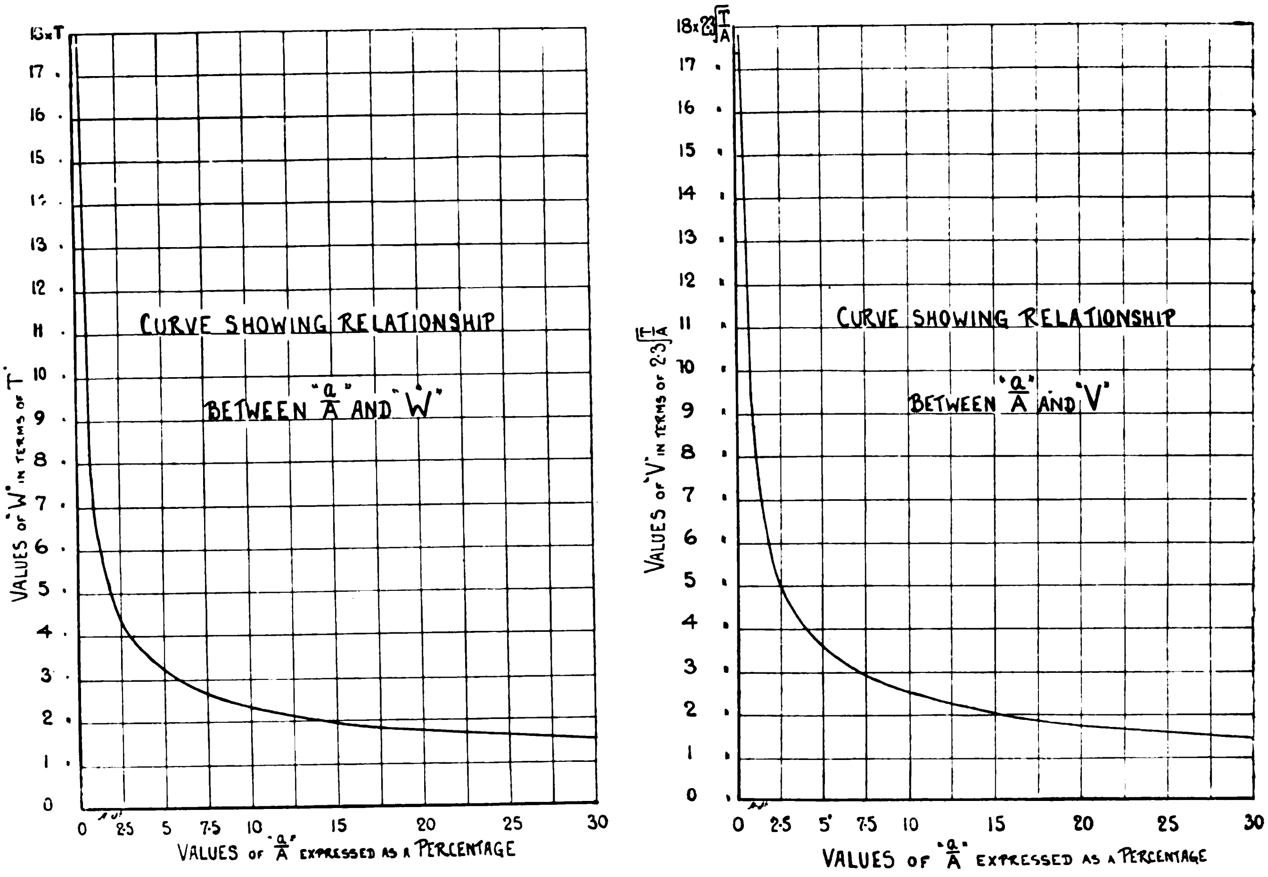
α	Inclination of aeroplane to the horizontal.
β	Inclination of propeller shaft to the horizontal.
A	Effective area of the supporting surface.
a	Effective area of the framework, &c.
T	Thrust of the propeller.
R	Total wind pressure acting normally to the surface of the aeroplane.
r	Windage or resistance due to framework, &c.
V	*Horizontal* velocity of the aeroplane.
Pα	Pressure on unit area of a plane moving *horizontally* with unit velocity while inclined at an angle α to the horizontal.
P90	Pressure on unit area of a perpendicular plane moving *horizontally* with unit velocity.

retardation on the machine, and if these exactly balance the horizontal forward thrust of the propeller as shown in the equation, then there is no horizontal acceleration—that is, the machine will move steadily forward.

Now, substituting the values for R and r found in equations (i) and (ii) we get two further equations for vertical and horizontal equilibrium, and from these we get the general equation for W, namely :—

$\frac{a}{A}$	α	β	W	V
%	° ′	° ′		
·1	0 20	0 50	72·0 × P	$255 \times \sqrt{\frac{T}{A}}$
·2	0 50	1 40	36·0 ,,	160 ,,
·3	1 10	2 30	24·0 ,,	143 ,,
·4	1 40	3 10	18·0 ,,	127 ,,
·5	2 0	4 0	14·4 ,,	114 ,,
1·0	4 0	8 0	7·2 ,,	80·9 ,,
2	5 30	11 20	5·1 ,,	57·2 ,,
3	7 0	14 20	4·0 ,,	45·2 ,,
4	7 50	16 10	3·6 ,,	40·1 ,,
5	8 40	18 0	3·2 ,,	35·9 ,,
6	9 30	19 40	3·0 ,,	32·8 ,,
7	10 10	21 10	2·8 ,,	30·4 ,,
8	10 50	22 30	2·6 ,,	28·4 ,,
9	11 30	23 50	2·5 ,,	26·7 ,,
10	12 0	25 0	2·4 ,,	25·5 ,,
11	12 30	26 10	2·3 ,,	24·2 ,,
12	13 0	27 20	2·2 ,,	23·1 ,,
13	13 20	28 30	2·1 ,,	22·1 ,,
14	13 50	29 30	2·0 ,,	21·2 ,,
15	14 20	30 30	2·0 ,,	20·4 ,,
16	14 40	31 20	1·9 ,,	19·8 ,,
17	15 0	32 10	1·9 ,,	19·1 ,,
18	15 20	33 10	1·8 ,,	18·5 ,,
19	15 40	34 0	1·8 ,,	18·0 ,,
20	16 0	34 40	1·8 ,,	17·6 ,,
25	17 40	38 20	1·6 ,,	15·6 ,,
30	18 50	41 30	1·5 ,,	14·0 ,,
35	19 50	44 10	1·4 ,,	13·0 ,,
40	20 40	46 30	1·4 ,,	12·2 ,,
45	21 30	48 40	1·3 ,,	11·6 ,,
50	22 10	50 40	1·3 ,,	11·1 ,,

FIG. 2.—Table showing the best inclinations for the aeroplane and propeller shaft for various values of $\frac{a}{A}$. The probable lift and velocity are also given.



FIGS. 3 AND 4.—Curves showing how the "lift" and velocity of an aeroplane vary with the percentage of windage to its "sail" area.

(v) $W = T\frac{\cos(\beta-\gamma)}{\sin\gamma}$ where γ is some angle such as that $\tan\gamma = \left(1 + \frac{a}{A}\right)\tan\alpha + \frac{a}{2A}\cot\alpha$, and from this we deduce the two following equations (vi) and (vii), which give the values corresponding to a maximum W.

$$\text{(vi)} \qquad \tan\alpha = \sqrt{\frac{\frac{a}{A}}{2\left(1+\frac{a}{A}\right)}}$$

$$\text{(vii)} \qquad \tan\beta = 2\sqrt{\frac{a}{2A}\left(1+\frac{a}{A}\right)}$$

and from the above it is at once seen that this is entirely dependent on the relationship of "a" to "A" or the "windage" to the "sail," or aeroplane area.

Once, therefore, this ratio $\frac{\text{“a”}}{A}$ is known, it is easy to calculate a value for W from the formula

(vii) $W = T \operatorname{cosec}\beta$, which is derived from Equation (v).

In a similar way we get a value for V from the equation :—

$$V^2 = \frac{W - T\sin\beta}{\frac{\cdot 003\sin\alpha}{1+\sin^2\alpha}A\cos\alpha}$$

which is obtained from Equation (i).

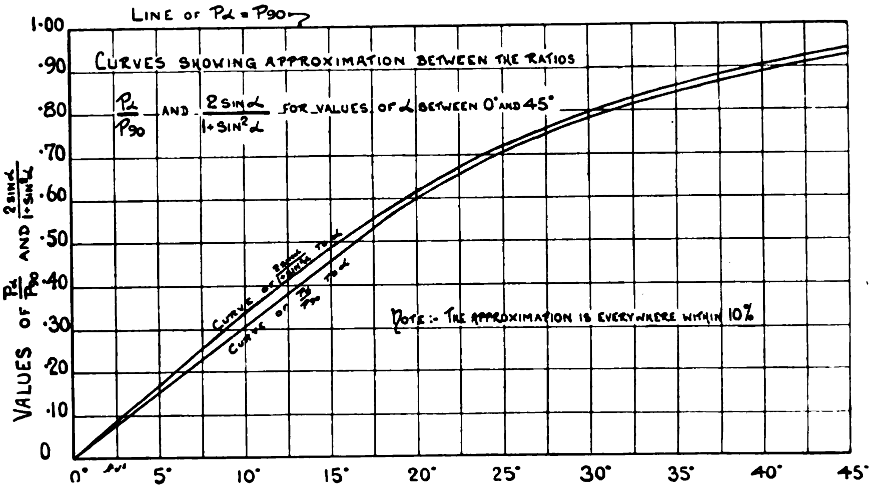


Fig. 5.—Curves showing how the pressure normal to an inclined aeroplane, as given by an empirical formula, agrees with value found by experiment.

From the above theoretical data the table in Fig. 2 was constructed, which gives a series of values for $\frac{a}{A}$ in its first column, and the corresponding best values for α and β in the second and third columns respectively. The fourth column gives the maximum total weight lifted in terms of T and the corresponding horizontal velocity is shown in the fifth column in terms of $\sqrt{\frac{T}{A}}$

These results are also set forth graphically in Figs. 3 and 4. In Fig. 3, the values of W have been plotted for all values of $\frac{a}{A}$ up to 30 per cent., while Fig. 4 shows a similar curve for V instead of W.

There is still one further point that is of considerable value in facilitating aeroplane problems, and it is embodied in an assumption made by Mons. Duchanel and pointed out by Prof. Langley, who applied it to the results of his experiments which he conducted in 1891. It is that for all practical purposes the equation :—$\frac{P\alpha}{P90} = \frac{2\sin\alpha}{1+\sin^2\alpha}$ holds good. How far these differ is shown graphically in Fig. 5, where the upper curve gives, from experimental results, the ratio $\frac{P\alpha}{P90}$ for values of α from 0° to 45°; the lower curve, however, is plotted directly from the empirical ratio $\frac{2\sin\alpha}{1+\sin^2\alpha}$. It will be seen that they approximate at all points within 10 per cent., and as the curves do not cross, a small permutant reduction in the value of the constant 2 in the above equation might be made for cases requiring greater accuracy, and yet ensure a positive error throughout the range.

The value of this assumption is considerable, for it enables us to estimate $\frac{P\alpha}{P\,90}$ directly we know α, which could not otherwise be done without experimental data.

The tables which apply to plain surfaces can be made applicable to curved surfaces, as follows ; for this purpose we may consider every curved surface to be equivalent to a certain plane surface. Experiment has shown that the pressure on a curved surface is greater than on a plane surface at the same inclination, and its direction is not perpendicular to the chord of the curve, but is tilted more forward, so that an aeroplane, in order to have the pressure upon it the same, and in the same direction, would have to be inclined at a much smaller angle to the horizontal. Hence to every aerocurve there is a certain aeroplane having a larger area but smaller inclination to the horizontal, which when moved with the same motion as the aerocurve will have an air pressure upon it the same in magnitude and direction as that upon the aerocurve, and we may imagine the aerocurve to be replaced by it for the purpose of using the tables.

As examples of the application of the table which has thus been prepared, the following examples have been worked out from practical data, which, however, is only approximate. In a machine such as that of the Wright Brothers in America, suppose A = 200 square feet, a = 19 square feet (obtained from say 200 lineal feet of 1½-inch diameter bamboos, wire stays, man, &c.), both the above being "effective" areas. The ratio $\frac{a}{A}$ is, therefore, in this case 9½ per cent., so that from the table in Fig. 1 we get the best values of α and β to be 11¼° and 24½° respectively, while the weight lifted would be about 2½T and the velocity about 26 $\sqrt{\frac{T}{A}}$ feet per second.

In a machine similar to Sir Hiram Maxim's we have about 4,500 square feet for "A," about 95 square feet for "a," while T is about 2,000 lbs., and the total weight of the machine being about 8,000 lbs. Here we have $\frac{a}{A} = 2{\cdot}1$ per cent. From the tables this would show that the aeroplane should have an inclination of 5° 40′ and the propeller shaft 11° 30′, and W would be 5T, or 10,000 lbs., *i.e.*, 25 per cent. in excess of the actual weight of the machine, and V 59 miles per hour. It is interesting to note that the tables give an inclination to the propeller shaft about twice that of the planes, and which causes it to point above the aeroplane, a method which has not yet been tried, so far as the author is aware.

In concluding his paper, Mr. Clarke made some remarks on flying machines of the vertical screw type, and also explained a small model of that type which he had brought to illustrate his remarks.

The Brothers Wright, we learn, went out again on the 26th of last month with their motor-driven aeroplane. There was a high wind blowing, but the machine progressed satisfactorily against it for a distance of 30 metres, when, unfortunately, owing to something going wrong with the motor, the aeroplane had to be brought down to the ground. Fortunately nothing in the way of an accident took place, and we hope soon to have news that a more satisfactory flight has been effected.

We have had no recent news of M. Archdeacon's proceedings at Berck-sur-Mer, but trust that his experiments in gliding flight are being continued, and that we shall soon be in a position to chronicle more prolonged glides than he has yet accomplished.

Referring to the illustrated description of the H. F. Vulcaniser, which we gave on April 30th last, Messrs. Harvey, Frost, and Co. inform us that their experience, and that of their many customers, has shown that it is not necessary to have any previous knowledge of vulcanising to ensure successful results with their form of apparatus, with which they issue a useful "Hints and Instructions" handbook.

GLASGOW TO LONDON RELIABILITY TRIAL FOR TOURING CARS, 19th and 20th MAY.

IN the results of this Trial just issued by the Scottish Automobile Club (Western Section) Committee, the report points out that—

The highest number of marks possible for reliability is 1,000. One mark is deducted for every minute, or part of a minute, during which the vehicle was at rest from start to conclusion of the Trial, with exception of compulsory stops at Penrith, Leeds, and Stamford, and stops for traffic or by order of a club steward. One mark has also been deducted for every minute in excess of the maximum time allowed for each stage. At Penrith, Leeds, and Stamford ten minutes were allowed for replenishing and lubricating, and time was taken one minute after the order to start the engine was given. Only two gallons each of petrol and water, other than that contained in the usual tanks, might be carried.

The marks for the Hill-Climbing Test on Woodcock Hill, Elstree, are arrived at on the basis of the following formula:—

$$\frac{(w \times 60 \times L) + (W \times h) + \frac{(W \times v^2)}{2}}{a \times n \times s \times \left(\frac{G}{D\pi}\right)}$$

EXPLANATION OF SYMBOLS.

w = Laden weight of car in tons.
L = Length of hill in feet.
W = Laden weight of car in lbs.
h = Height of hill in feet.
v = Velocity in feet per second.
a = Area of piston in square inches.
n = Number of cylinders.
s = Stroke in inches.
G = Gear ratio or number of revolutions of engine for one revolution of road wheel on lowest gear.
D = Diameter of road wheel in feet.

Woodcock Hill is 710 feet in length, 62·62 feet in height, and has an average gradient of 11·3, and a gradient of 7·3 at one portion.

A gold medal is awarded in each class to the vehicle having full marks for reliability making the best results in the Hill Test, as determined by the formula. The gold medals have been gained by:—In Class A—6-h.p. Light Wolseley, entered by Rennie and Prosser, Limited; in Class B—10-h.p. Argyll, entered by Hozier Engineering Company, Limited; in Class C—20-h.p. Thornycroft, entered by Thornycroft Steam Wagon Company, Limited.

Description of Car.	Starting Order.	Seats.	B.H.P.	Cylinders.	Bore and Stroke.	Weight.		Tyres.*	Price Complete.	Marking for Reliability.			Hill-Climb.		
						Unladen (approx.).	With Passengers.			†Deduct for		Net.	Time.	M.P.H.	Marks.
										Tyres.	Other Causes				
I.—CLASS A. *Petrol Vehicles having One Cylinder.*															
						cwt.	tons. cwts. qrs.		£ s. d.				min. sec.		
6 h.p. Vauxhall	8	2	6	1	4 in. × 5 in.	6½	0 11 2	Dunlop	150 0 0	—	7	993[1]	1 29⅕	5·42	1405
6½-h.p. Cadillac	21	4	9·65	1	5 in. × 5 in.	11	1 0 2	Clincher	210 0 0	19	22	959[2]	1 3⅕	7·65	2225
6-h.p. Light Wolseley ...	26	2	6	1	4½ in. × 5 in.	8½	0 15 2	Dunlop	175 0 0	—	—	1000[3]	0 50⅖	9·60	3129
II.—CLASS B. *Petrol Vehicles having Two Cylinders.*															
12-h.p. Gladiator	2	4	14	2	105 mm. × 130 mm.	15	1 5 1	Dunlop	395 0 0	20	—	980[4]	0 59⅕	8·17	2089
10-h.p. Argyll	4	4	12	2	88 mm. × 140 mm.	13	1 1 3	Clincher-Michelin ...	350 0 0	—	—	1000[5]	0 58	8·34	2152
10-h.p. Ryknield	7	4	10	2	4 in. × 4½ in.	15¾	1 3 3	Continental	367 10 0	—	2	998[6]	1 41	4·79	1773
12-h.p. Richardson	9	4	14	2	105 mm. × 130 mm.	17	1 4 2	Michelin	378 0 0	15	13	972[7]	1 5	7·44	2109
12-h.p. Eagle Light	12	2	12	2	110 mm. × 130 mm.	10½	0 18 3	Michelin	280 0 0	—	—	1000[8]	0 55⅕	8·76	1469
12-h.p. Arrol-Johnston ...	13	6	12	2	4¼ in. × 6½ in.	26	1 17 2	Shrewsbury-Challiner	470 0 0	—	—	1000[9]	1 23⅘	5·77	1336
12-h.p. Siddeley	17	4	12	2	4½ in. × 4½ in.	16	1 4 3	Continental	450 0 0	—	2	998[10]	0 58⅘	8·23	2146
12-h.p. De Dion	22	4	15	2	100 mm. × 110 mm.	16	1 5 1	Dunlop	525 0 0	—	25	975[11]	0 57⅖	8·43	2966
16-h.p. Maxim	24	4	16	2	110 mm. × 120 mm.	21½	1 8 3	Continental	470 0 0	25	—	975[12]	1 21⅕	5·96	2395
6 h p. Creouan	28	4	8	2	100 mm. × 100 mm.	13	0 19 0	Michelin	250 0 0	20	150	830[13]	Time on hill not recorded		
8½-h.p. Humber	29	4	8½	2	3⅝ in. × 4¼ in.	12½	1 1 0	Clincher	262 10 0	19	54	927[14]	1 2⅖	7·75	2546
8–10-h.p. Vulcan	31	4	10	2	3½ in. × 4½ in.	13	1 0 1	Clincher	225 0 0	—	116	884[15]	Time on hill not recorded		
III.—CLASS C. *Petrol Vehicles having Three or more Cylinders.*															
16-h.p. Sunbeam	1	4	16	6	80 mm. × 120 mm.	18	1 8 0	Continental	750 0 0	—	39	961[16]	Time on hill not recorded		
14-h.p. Renault, 1904 ...	3	4	16½	4	90 mm. × 112 mm.	15	1 9 2	Clincher-Michelin ...	630 0 0	—	1	999[17]	0 45⅘	10·56	3039
12-h.p. Argyll	5	4	14	3	90 mm. × 120 mm.	16	1 4 2	Clincher-Michelin ...	425 0 0	—	50	950[18]	5 18	1·52	1177
16-h.p. Argyll	6	4	20	4	88 mm. × 130 mm.	16¼	1 5 0	Clincher-Michelin ...	550 0 0	—	2	998[19]	0 42⅖	11·41	2614
16–20-h.p. Martini	10	4	20	4	100 mm. × 130 mm.	22	1 8 3	Continental	720 0 0	45	—	955[20]	0 32⅕	15·03	3301
24-h.p. Eagle Light	11	2	24	4	110 mm. × 130 mm.	15	—	Michelin	450 0 0	—	—	—[21]	—	—	—
12-h.p. Sunbeam	14	4	12	4	80 mm. × 120 mm.	17	1 5 2	Collier	537 12 0	—	—	1000[22]	0 45⅘	10·56	2631
12-h.p. Pipe	15	4	15	4	80 mm. × 124 mm.	16	1 4 1	Michelin	390 0 0	22	—	978[23]	0 43⅘	11·05	2443
16-h.p. Rochet-Schneider ...	16	4	16	4	100 mm. × 140 mm.	19	1 8 2	Clincher-Michelin ...	725 0 0	—	9	991[24]	0 41⅖	11·69	2656
24-h.p. Delahaye	19	4	24	4	4 in. × 5½ in.	19	1 12 3	Michelin	829 10 0	—	8	992[25]	0 34⅘	13·91	2745
18-h.p. James and Browne ...	20	4	18	4	4 in. × 6 in.	18	1 9 0	Palmer	650 0 0	—	—	1000[26]	0 49⅖	9·79	2201
18-h.p. Baudouin-Dechamps	23	4	18	4	95 mm. × 120 mm.	1050 kilos.	—	Michelin	550 0 0	—	—	—[27]	—	—	—
20-h.p. Thornycroft ...	25	4	20	4	4 in. × 4⅜ in.	19 cwt.	1 8 2	Palmer	660 0 0	—	—	1000[28]	0 38⅗	12·54	2733
18-h.p. Siddeley	27	4	20	4	4 in. × 4 in.	18½	1 7 2	Palmer	650 0 0	—	40	960[29]	0 39⅗	12·22	3276
18-h.p. Renfrew	30	4	18	4	95 mm. × 120 mm.	18	—	Clincher	450 0 0	—	—	—[30]	—	—	—

* All pneumatic tyres excep No. 13.

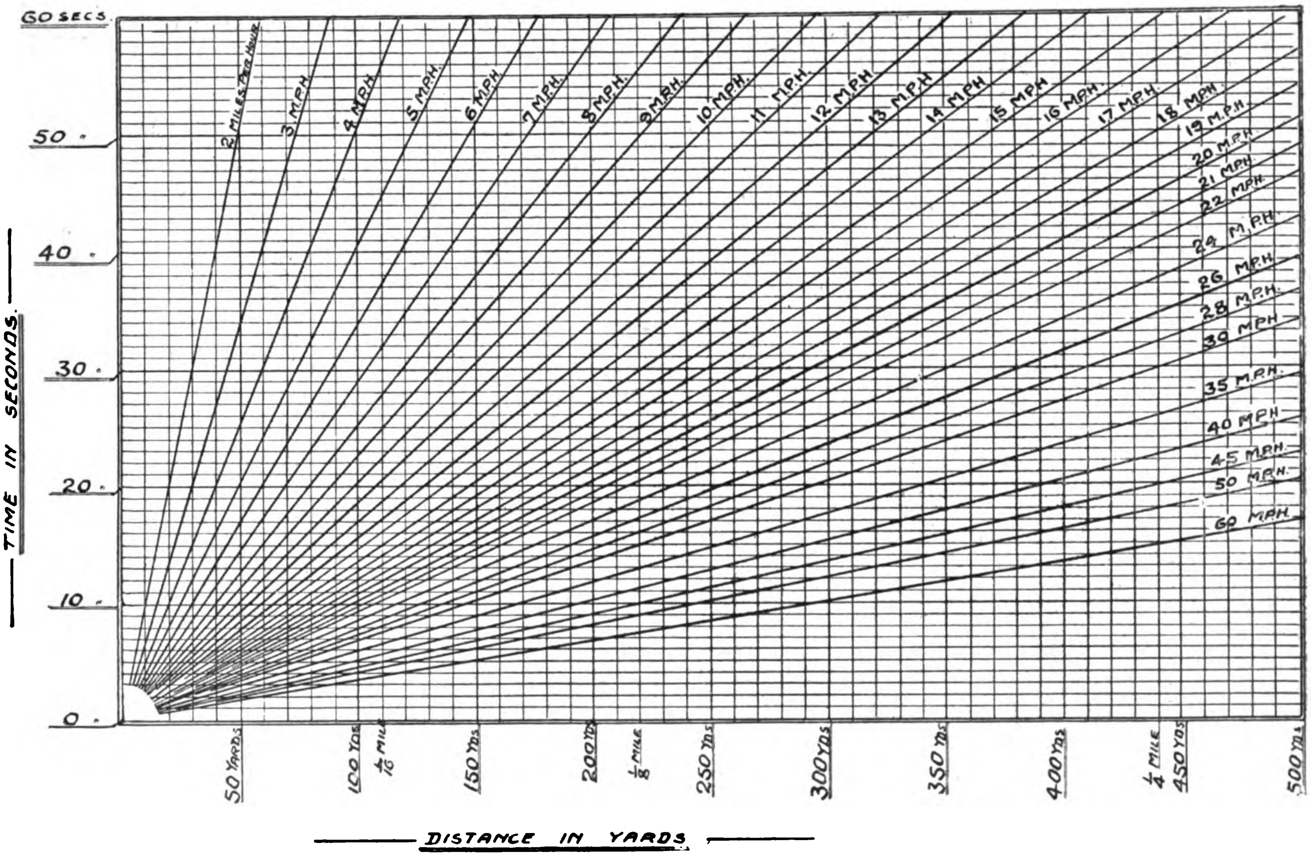
† For details of deductions and remarks see notes on next page.

Glasgow to London Reliability Trial.—Particulars of deductions and remarks:—[1] Changing sparking plug, 7. [2] Puncture, 19; ignition, 5; exhaust-valve sticking, 15; broken wire on switch, 2. [3] Non-stop. **Gold Medal.** [4] Puncture, 20. [5] Non-stop. **Gold Medal.** [6] To take on water, 2. [7] Puncture, 15; carburettor closed with vibration, 2; indiarubber water connection burst, 9; two driving stops, 2. [8] Non-stop. [9] Non-stop. [10] Excess time occupied in restarting at Leeds over one minute allowance—petrol not reaching carburettor, 2. [11] Choked carburettor, 25. [12] Puncture, 25. Had to be pushed on hill by mechanic from the car. [13] Cleaning carburettor, 15; adjusting coil, 6; repairing steering, 3; over maximum time, 7; four stops, want of power, 19; overheating, 14; overheating and examining inlet-valve, 19; cleaning commutator and testing accumulator, 11; examining plug and carburettor, 21; cleaning commutator, &c., 29; ignition, 1, 5; puncture, 20. Had to be pushed on Woodcock Hill. Took on two gallons petrol contrary to rule. [14] Broken sparking-plug porcelain, 3; new plug, and picking broken porcelain out of cylinder, 43; replacing inlet-valve, 8; two punctures, 10, 9. [15] Repairing leaking radiator and oiling clutch, 75; overhauling commutator spring, 10; emptying and refilling tank, into which water was put in mistake for petrol, 30; on Woodcock Hill, 1. Shed one passenger on Woodcock Hill, and ascended backwards. [16] Stop at Woodcock Hill, 37; unnecessary voluntary stop in London, 2. [17] Driving stop, 1. [18] Petrol not reaching carburettor, 1, 1, 7; cleaning commutator, 5; head of connecting-rod on crank-shaft heated, 26; fixing loose wire, 1; over maximum time, 9. Had to be pushed on Woodcock Hill. [19] Excess time occupied in restarting at Leeds over one minute allowance, 1; driving stop, 1. [20] Two punctures, 45. [21] Car withdrawn at Leeds; gear-shaft seized in Leeds before reaching storage depôt; non-stop to that point. [22] Non-stop. [23] Puncture, 22. [24] Differential brake fired, 4; petrol not reaching carburettor, 4; driving stop, 1. [25] Petrol supply ran short, awaiting supply, 6; two driving stops, 2. Carried two gallons petrol in excess of allowance by rules, and obtained extra supplies by the way. [26] Non-stop. [27] Car withdrawn at Leeds owing to trouble with expanding friction-clutch. Previous stops—14 driving stops, 17; replacing broken cotter-pin in change-speed-gear, 34; refixing same, 28; over maximum time, 1. [28] Non-stop. **Gold Medal.** [29] Taking on water, 3, 3, 3, 3; ignition, 19; momentary stops due to trouble with the gear lever, 9. Carried water in excess of quantity permitted by rules. [30] Withdrawn at Carlisle owing to defective pump; previous stop at Gretna for same cause, 84.

DIAGRAM OF SPEED IN RELATIONSHIP TO DISTANCE COVERED, AND TIME TAKEN.

(Prepared by G. W. Watson, A.M.I.M.E.).

Speeds, between two and sixty miles per hour, are indicated by the diagonal lines, these corresponding with the distances, plotted horizontally in yards and fractions of miles up to 500 yards, and with time taken in seconds, plotted vertically up to 60 seconds.



EXAMPLE SHOWING THE USE OF DIAGRAM.—A car is timed over a distance of 400 yards, and takes seconds. What is the speed at which the car is moving?—On the base line will be found divisions marked in yards, follow the vertical line over 400 yards until it is intersected by the horizontal line (from the side marked seconds) denoting 41 seconds. The diagonal line cutting through this point of intersection indicates the speed in m.p.h. = 20.

REVIEWS OF BOOKS.

"The Automobile": A Practical Treatise on the Construction of Modern Motor Cars. Edited by Paul N. Hasluck. Second Edition. London: Cassell and Co., Limited.

THE original edition of this exhaustive work was modelled on the elaborate French treatise of Gerard Lavergne's "Manuel Theoretique et Pratique de l'Automobile sur Route," but was considerably amplified and enlarged by Mr. Hasluck, a feature being the number of illustrations added to the work, taken very largely from the back numbers of THE AUTOMOTOR JOURNAL, his indebtedness to which, both for the illustrations and in some cases for details of the systems described, Mr. Hasluck acknowledges in generous terms.

The work deals with the whole field of automobile construction, and gives very exhaustive details of all the main systems of self-propelled locomotion employed. The book is obviously intended as a work of reference for the amateur, as difficult technical problems are in general left unattacked, and the data furnished in regard to the systems described are confined within limits which will be readily comprehended by the least technical reader. For the general public this is undoubtedly an advantage, and it is an advantage which is rendered the more noticeable as the descriptions of the cars, systems, and details of all kinds, are singularly clear and lucid.

Though Mr. Hasluck does not ostentatiously divide his work into different portions, it may yet be naturally subdivided into certain main headings. These comprise details of the systems for generating power, including steam boilers, steam motors, carburettors for petrol engines, and petrol motors. All these items are treated separately from the cars and systems on which they are employed. Then follow clear, and at the same time exhaustive, descriptions of the main constituents of motor vehicles, including axles and steering gear, wheels and tyres, brakes, and the like important matters, and then we are introduced to the different systems in which the various sources of power above referred to are practically applied.

The substantial work, which comprises 800 odd pages with an admirable index, is quite an encyclopædia on automobilism in its way. Incidentally it suffers from a defect which must be characteristic of almost every exhaustive treatise on the subject. Improvements are introduced rapidly; systems come into vogue and meet with general approval, while almost as rapidly many other systems which once promised well pass out of the fashion and gradually die a natural death. Every elaborate work takes a long time to prepare, and what was up-to-date when its preparation was commenced is consequently often somewhat antiquated when the book is through the press. The present work of course suffers in this way, and thus unavoidably many of the most recent variations of construction in many important systems are not to be found in its pages, although the book in general is admirably up-to-date. But the book suffers from another slight defect. It is not, in our opinion, critical enough, and it includes systems and appliances that either never promised much, or have at any rate been but very little used, and describes them with as much wealth, both of illustration and letterpress, as is devoted to extremely practical and important systems which have proved their value by the enormous business that has been done with them. There is nothing to warn the casual reader how to distinguish. If, however, the possessor looks upon the work practically as an illustrated cyclopædia of automobilism, and takes his opinion of the relative importance of the different systems from other sources, he will find it very valuable and useful.

"The Best Way Out of London." Edited by the Hon. John Scott Montagu, M.P. London: (Publisher, *The Car* Illustrated), Limited. 1*s*. 6*d*.

LONDON has been described as a splendid town—to live out of. The automobilist, at any rate, is very largely occupied in getting out of it, and though the old hands know most of the ways by which they can dodge the traffic and get into the country in the shortest time and with the minimum degree of exasperation, there are many commencing automobilists, and automobilists temporarily in London from other parts, who do not know the secrets of doing this satisfactorily. To these the present work will appeal strongly, for it gives in succinct language, and accompanied by admirable maps, each an example of lucidity in map construction, practically all the principal directions for escaping into the country, and these directions are accompanied by a few words descriptive of the chief routes which are well put together, extremely attractive reading and historically interesting. A special part of the work consists of several pages devoted to "the best ways to avoid London." There are many people to whom this title will appeal, and they will find several useful routes for avoiding the metropolis both from north to south and from east to west, while an interesting series of short articles on the worst hills in England is of interest and use to all.

"Throup's North Wales Cyclist's and Motorist's Guide." London: Deacon and Co.

THIS is a handy little volume with plenty of good itineraries, and will be specially useful to the class of tourist who covers large tracts every day, though it is scarcely sufficiently detailed for the more leisurely-minded man. It has, however, the information which is required by the rapid mover in well concentrated and readable form.

"Throup's North of England."—A similar little guide, and uniform with the work above referred to, deals with the most picturesque parts of Yorkshire, is very well illustrated, and gives considerable information both in regard to the main features of the scenery and the principal places of archæological and general interest. It is accompanied by a clear map, and includes useful short itineraries.

"Das Gordon-Bennett Rennen, 1904." Frankfurt-am-Maine: Frankf. Reklame Gesellschaft.

THIS is a handy little volume giving the history of the Gordon-Bennett contest with the results of the previous races, and above all, a very detailed account of this year's course in the Taunus. The description of the course is accompanied by a map, and also by contours, and for those who intend to visit the race and who know German it should prove handy and useful.

RACES, RECORDS, AND TRIALS.

Laffrey Hill-Climb, it is announced, will not be held this year.

Rochet-Schneider Cup.—For the second year this inter-club challenge cup was competed for on Saturday last. The event is one for *bonâ fide* tourist vehicles only, the amount of fuel consumption and regularity of running being the chief factors in determining the winner. The present holders of the cup, by whom the trial is organised, is the A.C. de Rhone. The distance of the course was 346 kiloms., the chief points touched being: Saint-Clair, Meximieux, Serrières, Saint-Claude, Mijoux, Faucille, Gex, and Amberieu. Twenty-five competitors started out of an entry of 27, and only one of these failed to finish the course in good time. During the early part of the run splendid weather was experienced, but towards the end of the day very heavy rain fell. The times on two hills were taken, viz., at Serrières (5 kiloms.) and at Faucille (4·3 kiloms.). In the two hill-climbs, which totalled up to 7·267 kiloms., the best times made were by Dumond, 15 min. 46 sec. (24-h.p. De Dietrich); Chalencon, 15 min. 49 sec. (24-h.p. Berliet); and Gobalcool, 17 min. 2 sec. (14-h.p. Buire). The slowest times were: Charbin, 36 min. 21 sec. (25-h.p. Peugeot); Boissy, 39 min. 2 sec. (12-h.p. Peugeot); and Joltrois, 46 min. 59 sec. (25-h.p. Peugeot). In fuel consumption Mattard, with a 24-h.p. Rochet-Schneider, was first, and Tavernier (20-h.p. Pilain) second. The highest points in the general classing were gained by: 1, Martini (16-h.p. Martini), 1086; 2, Weitz (20-h.p, Pilain), 1077; and Chalencon (24-h.p. Berliet), (1073).

The 634 Miles Tour, extending over eight days, organised by the A.C. of America, to Gettysburg and back *via* Atlantic City, Lakewood, and Asbury Park, which commenced during the last week in May, appears to have been far from a success. Only three cars reached the 100-mile point with the intention of going right through, whilst five only even went as far as Philadelphia. About twenty had entered, and the club secretary, Mr. S. M. Butler, had been at needless pains to arrange along the entire route for hotel and garage accommodation, fuel, &c.

Eight competitors took part in the Consumption Trials of the A.C. of Marseilles last Sunday, when under the rules each car was allowed a half litre of petrol per 100 kilogs. of weight, including passengers. They then travelled round a 15 kilom. course until their fuel was exhausted. The chief results were as follows:—

1. Masse (920 kilogs.), 77 kiloms.
2. E. Roustant (Rochet-Schneider, 1,200 kilogs.), 64 kiloms.
2. De Fabrègue (De Dion-Bouton, 1,140 kilogs.), 52 kiloms.

Circuit des Ardennes.—About fifty entries have now been received for the Belgian Circuit des Ardennes, which takes place on July 25th. At a recent meeting of the A. C. of Belgium the weight of the big cars has been fixed at 1,000 kilogs., the light cars at 700 kilogs., and voiturettes at 450 kilogs. Entrance fees up to July 9th, are, for the first two categories, 1,000 fr., voiturettes, 500 fr., motor bicycles over 50 kilogs., 100 fr., under 50 kilogs., 50 fr. After July 22nd entrance fees will be doubled.

Mr. R. M. Wright. Mr. B. C. Holmes. Mr. T. Woodman. Mr. H. Brown.

THE MOTOR CYCLE RELIABILITY TRIALS IN LINCOLNSHIRE.—The last three competitors left in. "Checking" at Lincoln.

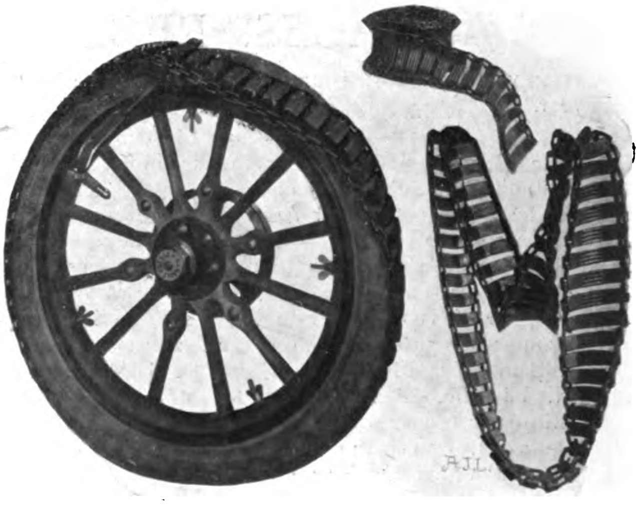
The A.C. of America have still under consideration the terms of entry for the Vanderbilt Cup in America. In some quarters it is thought they will determine to allow American cars only to participate for the first five years, and make the event International after that, but we doubt this very much.

The full rules and regulations of the International Competition for Industrial Vehicles, organised by the A.C. de France, and being held from August 22nd to September 2nd next, have now been issued. During this period the vehicles engaged will traverse about 1,000 kilometres, passing through a number of towns and villages *en route*, where exhibitions of the competing vehicles will be held upon their arrival, so as to increase the interest of the public and serve as an object lesson to the commercial districts through which the tests will take place. There will be four sections, sub-divided into classes, for which separate rules have been drawn up. The sections are :—

1. Competition for industrial vehicles, sub-divided into tests for rapid delivery vans and tests for heavy industrial vehicles.
2. Competition for electric touring cars and for electric delivery vans.
3. Speed and distance registering instruments.
4. Competition for pneumatic tyre protectors.

Full loads will have to be carried, and speed tests, brake tests, and hill-climbing powers will be a feature of the Trials. Fuel consumption will be one of the chief factors in ultimately determining the results.

THE Irish Automobile Club have decided to arrange a series of speed trials during August on the Silver Strand beach at Portmarnock, about six miles from Dublin. This is the same course which was recently selected by the Motor Cycle Union of Ireland for speed trials for motor cycles, which were illustrated in this journal. The surface of the sand is extremely hard, and the course gives about a 1½ miles run with a width which would enable at least six cars to run abreast with a good margin of safety. The actual date has not been fixed, but will probably be between August 26th and 30th, the meeting occupying two days.



SIDE-SLIP TRIALS OF THE A.C.G.B.I.—"L'Empereur" non-skid device, winner of the first prize. In the above illustration the method of levering the device into position over a partly deflated tyre is clearly shown, it is permanently held in place by fully inflating the tyre. On the right is seen the device detached, and above will be seen the small space into which it can be rolled up for carrying separately on the car.

MOTOR CYCLING.

A VALUABLE cup, presented by Messrs. Mecredy, Percy, and Co., Limited, proprietors of the *Motor News and Irish Cyclist*, has been offered to and accepted by the committee of the Motor Cycle Union of Ireland. It has been decided by the Union to offer this cup in a competition confined to members of the Union, to be ridden by teams of three riders, each rider to be mounted on the same make of machine, and the team doing the best performance to be declared the winners of the cup. A sub-committee has been appointed to consider the further details of the competition, and to consider the possibility of running the event on the track at Ashtown, Dublin, or on the Silver Strand at Portmarnock, where the recent competitions of the Union were held.

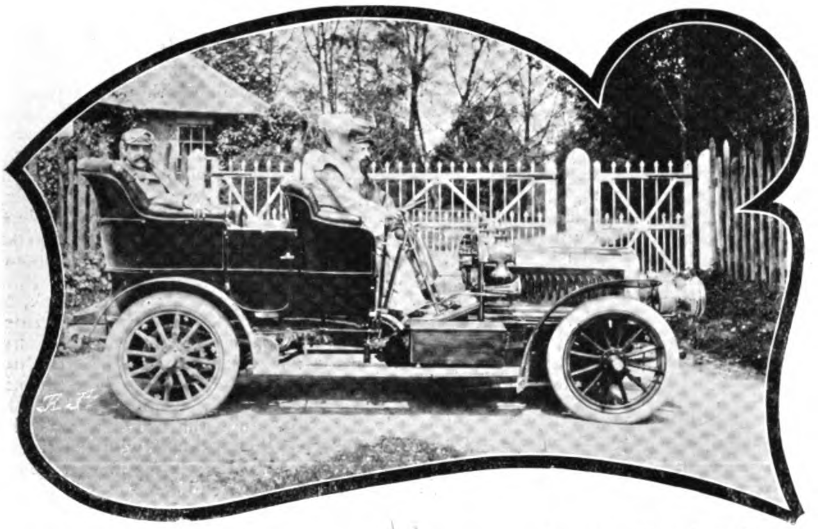
Auto Cycle Club.—A good course for this year's Reliability Trials for motor cycles has been located from Lincoln to Brigg and back, a total distance of about 50 miles. This run would include two clear stretches of 8 miles each, whilst only two small villages would have to be traversed between these two main points. This road appears to offer several advantages, and to comply with the features suggested at the meeting held at the Agricultural Hall, as there are one or two fairly stiff hills in the neighbourhood, and excellent accommodation is procurable in the district.

Motor Cycling Club.—The start for the 1904 Reliability Trial for the £20 trophy offered by Mr. S. F. Edge took place on Saturday last under the auspices of this club. The run must be absolutely non-stop, and adjustments of any description are prohibited. The course selected for this year starts close to the Bull Hotel, Redbourne, on the London-Coventry road, and extends a distance of 25 miles as far as Stoney Stratford. At the turning point the competitors are not permitted to dismount, but have to make their turn in the width of the road. In all, this road has to be covered eight times to complete the 200 miles. For Saturday's run 33 members entered, and 27 were sent off at short intervals, starting at 6 a.m. on Saturday morning. Short circuits, tyre troubles, and other minor mishaps put a large number of the competitors out of the running during the day. Those who were able to get through the day without any trouble, and who are therefore entitled to continue in the competition, are :—Messrs. T. Silver (Quadrant), Crundall (Humber), W. H. Wells (Vindec), F. Hulbert (Hulbert-Bramley), Johnson (Humber), C. Fox (Vindec), T. Hooydonk (Ariel), Hoffmann (Ariel), Sale (Quadrant), H. P. Mays (Vinco), Milligan (Bradbury), and S. B. Moore (Hulbert-Bramley).

TO-DAY, Saturday, June 11th, the surviving machines will be required to cover a distance of 300 miles, and any that may be left in after this run will again have to compete at subsequent dates until one only is left to claim the trophy. The second and third best machines will receive a gold and gold centre medal respectively, and certificates will be awarded to all members who completed the 200 miles at a mean speed of 15 miles per hour without dismounting. The winner of the trophy last year was W. J. Milligan after four ties.

The Motor-Cycle Reliability Trials in Lincolnshire.—An Exhaustive Test.—Although the third round in the eliminating motor-cycle trial organised by the Peterborough and District Motor Club, was entered upon on Thursday (June 2nd), at the time of writing the winner of the silver trophy offered in connection with the competition had not been decided, notwithstanding that the run had been extended, and the two finalists had been subjected to a further exhaustive trial. The event has proved a most interesting one to motorists in that part of Lincolnshire in which the event is taking place, and enthusiasm is increased as the concluding stage of the struggle progresses. The test is a 100-mile non-stop run from Peterborough to Lincoln and back, and no competitor is allowed to make any adjustment to his machine other than can he done from the saddle. Of the thirteen original competitors six succumbed in the first round and four in the second, leaving B. C. Holmes (Peterborough), 3½-h.p. Vinco-Minerva (Clipper tyres); T. Woodman (Peterborough) 2¾-h.p. Bat (Clincher tyres); and H. Brown (Peterborough) 2½-h.p. Bradbury (Clincher tyres) to meet in the third round which commenced on Thursday. A start was effected from Peterborough at 9 a.m., and all three machines completed the 100 miles non-stop without mishap. The committee, therefore, decided to extend the run for a further 50 miles (to Folkingham and back) and during this stage Brown broke the belt of his machine, after travelling 117 miles, and was obliged to retire. Thus Holmes and Woodman were left in the running, and although they continued until dark, the machines behaved so splendidly that it was impossible to decide a winner. At a subsequent committee meeting it was arranged, if possible, to decide the event this week. Our photograph shows the last three competitors "checking" at Lincoln. Mr. R. M. Wright, checker, is by the car to the left, the competitors being Mr. B. C. Holmes (EW B7), Mr. T. Woodman (FL 7), and Mr. H. Brown (FL 16.)

THE Criterium for motor bicycles, inaugurated last year by *L'Auto*, in which the cylinder capacity was limited, will again take place this year, viz., from October 3rd to 9th. The capacity of the motor, however, will be increased from ¼ litre to ⅓ litre.



A very attractive-looking car in the Glasgow to London Non-Stop Run, which was held recently, was the 24-h.p. Delahaye Car which, as will be seen by the official figures given this week, acquitted itself well during the run. Our photograph of this car is sent us by the Saxon Motor Company, Limited, of 176, Piccadilly, who advise us that they are now the sole British agents for this make of vehicle.

LAST year Messrs. De Dion Bouton et Cie., of Puteaux, France, organised an automobile excursion, visiting the borders of the Meuse, Moselle, and Rhine, to which all owners of De Dion Bouton vehicles were invited. The result was very successful, and we learn from the British De Dion Bouton Company that at the present time arrangements are being made by the French Company for a similar excursion in the south of England. The cars taking part will assemble at Calais on July 10th, and be shipped on a special steamer for Dover. The tourists will leave on the 12th by the regular steamer Calais-Douvres Service, to take up the cars previously despatched in the morning, and then proceed to Sir David Salomon's residence near Maidstone, where a halt for the night will be made. The rest of the itinerary will be as follows:—

July 13th:—Depart for Portsmouth; 14th.—Stay at Portsmouth to allow those who desire to proceed to the Isle of Wight; 15th.—Proceed to Bournemouth, traversing Hampshire by way of Andover and Salisbury; 16th.—Bournmouth to Torquay through Dorsetshire; 17th.—Torquay to Plymouth through Devon; 18th and 19th.—Stay in Cornwall; 20th.—To Barnstaple; 21st.—Barnstaple through Somerset to Bristol; 22nd.—Bristol to Oxford; 23rd.—Oxford to London through Windsor; 24th and 25th.—Remain in London; 26th.—Return to Calais. The total distance is about 750 miles.

Any owner of a De Dion Bouton vehicle who would like to take part in same for the whole, or a portion of the time, will be supplied with further particulars in regard to hotel accommodation, &c., in due course by applying to Messrs. De Dion Bouton, Limited, 10, Great Marlborough Street, London, W.

THE proposal to employ motor horse-boxes for the conveyance of hunters to district meets is finding favour in France, and has also been adapted for the accommodation of the hounds as well.

MOTOR BOATING.

THE Hélice Club of France on Sunday last ran off their motor boat races in the Suresnes Dock at Paris. The chief prize was the Coupe de la Seine for racing craft, over a distance of 32 kiloms. This was secured by Marsouin II. (Darracq motor) in 52 min. 48⅗ sec., Titan II. second in 53 min. 44 sec., La Rapée III. third in 1 hr. 0 min. 12 sec.

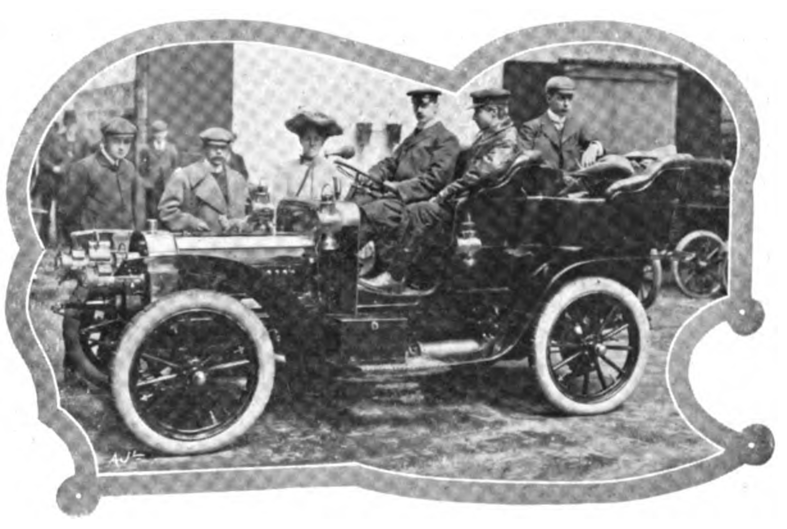
In the Cruiser Class, 1st series (6½-metre boats, 24 kiloms.) La Marguérite was 1st, time 1 hr. 11 min. 46⅓ sec.; 2nd, Orion III., 1 hr. 34 min. 33 sec.

2nd series (6½ to 8-metre boats).—1st, Titan III., 1 hr. 4 min. 40 sec.; 2nd, Arion II., 1 hr. 8 min. 43 sec.; 3rd, Allo III., 1 hr. 18 min. 8 sec.

3rd series (8 to 12-metre boats, 24 kiloms.).—Tenax II., 1 hr. 35 min. 28 sec.

A VALUABLE gold cup has been offered by H.M. the King for the international motor boat-race which will be held during the Kiel Regatta.

ONLY last week we recorded a successful attempt to drive a car to the top of Snowdon by Mr. Harvey du Cros on an Ariel. We learn from Mr. W. M. Letts, of Messrs. Charles Jarrott and Letts, Limited, that on Sunday last he determined to attempt the same feat with a standard 5-h.p. Oldsmobile. Starting at 6.57 a.m., Mr. Letts reached Hebron Station at 7.11 and the half-way station at 7.33 a.m. Keeping on steadily, he arrived at the summit of Snowdon at 8.24 a.m., the five miles having been covered in 57 minutes actual running time, a very remarkable performance. At times the car was dangerously near to the edge of the sleepers owing to the differential gear being almost in contact with the track of the railway, rendering it, therefore, difficult to steer.



Mr. Perman starting on the Spyker Car from the Locomobile Garage. (See page 706).

CLUB DOINGS.

Herefordshire Automobile Club.—This club held a successful hill-climbing competition for motor cycles on Saturday, June 4th, the hill chosen for the contest being Maples Hill, on the road between Boxmoor and Chesham, one of the stiffest gradients for miles round. The gradient ranges from 1 in 7 to 1 in 9. After weighing in at Boxmoor Station, the competitors proceeded to the hill, which lies about three miles beyond Boxmoor, where some thirty members and friends had assembled to watch the contest.

There were six starters, these being Messrs. N. B. Kenealy (2¾-h.p. Bat), Dr. Ker (2¾-h.p. Bradbury), A. Hunt (2¼-h.p. Kerry), B. Crump (3½-h.p. Trimo), W. S. Coles (2¾-h.p. F.N.), and C. Wood (2½-h.p. Kerry). Each competitor was allowed three climbs, the time made at the best essay being taken for the purposes of awarding the prizes. Only three succeeded in reaching the top of the hill, the gradient proving too much for the other machines. The following were the times made by those who succeeded in surmounting the hill:—Dr. Ker, 21⅖ sec.; Mr. A. Hunt, 25⅗ sec.; Mr. B. Crump, 42⅕ secs. After deducting handicap allowance, Mr. Hunt was adjudged the winner.

Mr. E. Kenealy officiated as timekeeper, while the starting and handicapping were undertaken by Mr. W. Whittal (Hon. Secretary).

The handicapping was based upon the formula of multiplying the list horse-power with number of seconds taken in ascending the hill, and dividing by the weight in pounds of machine and rider.

Norfolk Automobile and Launch Club.—The second meet of the Yarmouth, Lowestoft, and Beccles section of this club took place at the Bridge Hotel, Potter Heigham, on Thursday last week. A considerable number of automobilists had joined in the run, amongst those present being Mr. and Mrs. A. E. Lark, Yarmouth, 12-h.p. Brooke; Mr. and Mrs. H. W. Williams, Norwich, 2½-h.p. De Dion; Mr. and Mrs. Mawdesley Brook, Lowestoft, 14-h.p. Brooke; Mr. John Griffin, Norwich, 12-h.p. Gladiator; Mr. and Mrs. Estcourt, Wroxham, 14-h.p. Brooke; Mr. E. King and Mrs. Bradley, Yarmouth, 8-h.p. Daimler; Mr. and Mrs. W. W. Williams, Norwich, 4½-h.p. De Dion; Mr. and Mrs. Meyer, Gorleston, 10-h.p. Swift; Mr. and Mrs. Addison-Williamson, Yarmouth, 5-h.p. Locomobile; Mr. H. L. Clarke, Norwich, 6-h.p. De Dion. There were also present Mr. J. Brooke, with his new racing motor launch, Baby, 14-h.p., and Mr. Bruce Leach, with his motor boat, Stormy Petrel (Brooke, 14-h.p. engine). Mr. Brooke ran trips with the Baby, several members of the club, with their friends, embarking.

North-East Lancashire Automobile Club. — During the present month several runs have been arranged. These comprise for Thursday of this week, Bolton-by-Bowland, the Coach and Horses Hotel; to-day (Saturday) the club will join in the inter-club meet at the Empire Hotel, Buxton; June 18, Slaidburn (Hark to Bounty Hotel) will be the destination, and on the 30th inst. a number of the members of the club have arranged to attend upon the Lancashire and Cheshire Branch of the British Medical Association, who are holding their annual conference in Blackburn this year. Members of the association will be driven in the club cars to Hurst Green with a view to their visiting Stoneyhurst College.

Nottinghamshire Automobile Club.—The result for the Hill-Climb Handicap of this club, held at Kettleby Hill on May 28th, is announced. The competition was confined to tourist cars of members. Dr. Gass, of Nottingham, has been declared the winner with his 10-h.p. Georges-Richard car, with four up, his time being 4 min. 40 sec.

Scottish Automobile Club (Western Section).—Last Saturday, the 4th inst., was an ideal day for motoring, and the attendance at the Western Section monthly meet was consequently large. The gathering point was Tarbet Hotel, on the side of Loch Lomond, which may be reached either by the side of that loch or by the Gareloch, over Whistlefield Hill and along the banks of Loch Long, then across from Arrochar to Tarbet. Both roads were favoured considerably, and at the meeting hour there were probably over 100 members and friends present. After tea and the usual exchange of courtesies the homeward road was taken, some of the cars proceeding up the loch as far as Ardlui, and home by Callander, others returning by the roads already mentioned.

Sheffield Automobile Club.—The Motor Cycle Hill-Climb, which was held at Padley Wood Hill, last Saturday, by this club, was the first part of the annual hill-climb which was inaugurated last season. It was thought advisable this year to separate the motor cycles from the cars, and the competition amongst the cars is to take place on Saturday next, June 18th, at the same spot. Ideal weather was experienced for the meeting, and this helped to bring together a considerable gathering of cars and a large number of interested spectators. The prize to be contested for was a Challenge Cup presented by Mr. Harvey Foster, the present holder of this being Mr. W. H. Brown. 12 competitors had entered, of whom 9 started, 3 retiring from the contest, including the holder of the Cup, Mr. W. H. Brown. The start was timed for three o'clock, but owing to stragglers and other causes, a little delay was experienced in getting the machines away, the final competitor being sent off up the hill after 4 o'clock. The course was the same as last year, from Grindleford Bridge to the Lodge Gates near Longshore Shooting Box, a distance of about 1¾ miles. Mr. M. Machin abandoned the contest through a slipping belt, and the winner was Mr. F. W. Oates, on a 2¾-h.p. De Dion tricycle, with the time of 7 mins. 32 secs., he gaining under the handicap formula 21·6 marks. The full results for the handicap were as follows:—

	m.	s.	Mks.
1. F. W. Oates, 2¾-h.p. De Dion tricycle, 4 cwt.	7	32	21·6
2. W. L. Gilder, 2¾-h.p. Royal Enfield tricycle, 3 cwt. 1 qr.	6	19	20·9
3. W. James Fairfield, 3-h.p. Griffin, 2 cwt. 2 qrs.	4	52	19·1
4. J. Walker, 3½-h.p. Devonshire tricycle, 4 cwt. 2 qrs.	8	25	17·1
5. C. Harlow, 3-h.p. Majestic bicycle, 2 cwt. 3 qrs.	6	57	14·7
6. F. B. Cawood, 2¼-h.p. M.M.C. tricycle, 3 cwt. 1 qr.	11	42	13·7

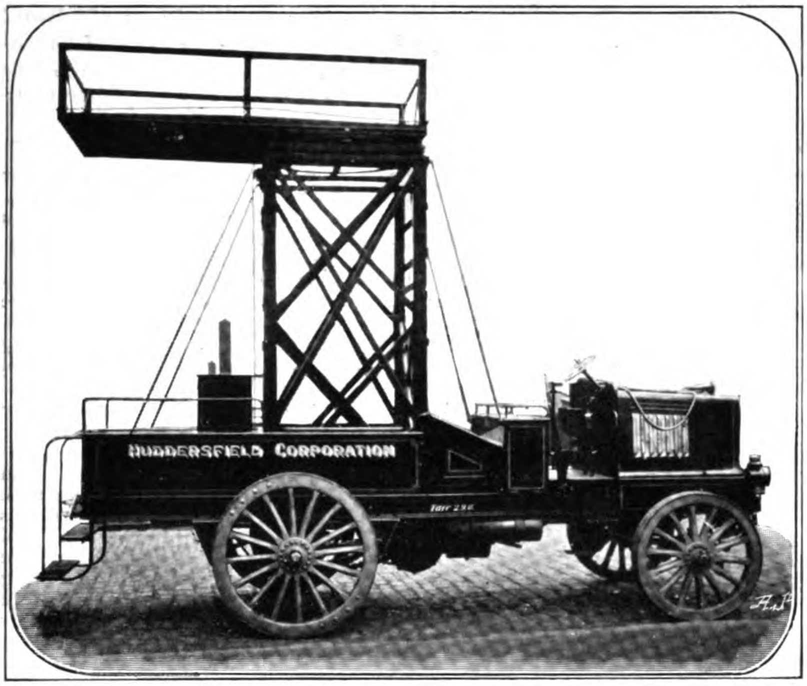
Retired—W. H, Brown, 2¾-h.p. Farnell bicycle, 3 cwt. 1 qr.; E. M. Machin, 3¼-h.p. Broomhall bicycle, 3 cwt.; J. T. Thompson, 3-h.p. Quadrant bicycle, 2 cwt. 2 qrs.

Last year the fastest time, when the roads were in a very bad condition, was 7 min. 9⅗ sec. Mr. Harvey Foster was amongst those who witnessed the trials. The contest over, a welcome adjournment was made to the headquarters of the club for the day, the Maynard Arms Hotel. The subsequent return journey to Sheffield by various routes, of which one was *viâ* the moors, proved a delightful finish up to the day's outing. Mr. W. E. Cope and Mr. J. R. Wade acted as timekeepers and starters at Grindleford Bridge, and Mr. Tom Lonsdale and Mr. Cooper Pearson took the times at the finishing post. The following were the chief officials:—Chief marshal and umpire, Mr. B. H. Gainsford; marshals, Messrs. James Barber, Ben Hind, J. Hind, J. E. Evans, T. Churchill, T. H. Chatterton, J. Ellis, E. Hadfield, and E. Hill; timekeepers, Messrs. W. E. Cope, J. R. Wade, T. Lonsdale, and Cooper Pearson; weigh clerk, Mr. L. C. Howlden; handicapper, Mr. J. R. Wade; hon. sec., Mr. F. B. Cawood.

Yorkshire Automobile Club.—Arrangements are in progress under the auspices of this Club to hold a motor gymkhana at Harrogate, probably on June 25th. The Municipal Council of the town have entered thoroughly into the spirit of the suggestion of the Club, and have appointed three of their members, viz., Alderman Milner and Councillors Holgate and Binns, as representatives on a special Committee for arranging the details. Stray Cricket Ground will probably be the place selected for the day, and the Gymkhana will be open for entry to all private owners of cars or cycles. A motor parade for which prizes will be given for the smartest car and also for the best decorated car, will be arranged to take place before the start of the gymkhana.

A hill climb is also to be held by the club, probably at a point locally known as Pot Bank, situated between Beckwithshaw and Killing Hall. The road selected is particularly quiet and in parts steep, ranging up to about 1 in 6, whilst there are two bends between the top and the bottom, and practically the whole of the course can be seen from the bottom. Mr. Walter Jackson, a member of the club, has promised to survey the hill, and the superintendent of the West Riding Police, in whose division the hill is situated, will, after consultation with some of the members of the Club Committee, co-operate in the arrangements for the meeting.

The Club Committee have determined to lodge a protest with the Local Government Board *re* the Leeds application for a speed limit, and the hon. secretary and the hon. treasurer have been busily engaged in getting together information in the Beverley and Todmorden speed limit enquiries.



Tower wagons for various purposes fixed to motor-driven chassis are now coming into use in many directions, not only amongst electric light and other trading companies, but also amongst many of the leading Corporations of the country. The Huddersfield Corporation have recently secured one of these, which is seen in our picture fitted with a 20-h.p. Thornycroft petrol motor. This vehicle when fully loaded is capable of a speed of 12 miles per hour. Although the wheels in the photograph are fitted with steel tyres, these are merely temporary, it being intended to fix solid rubber tyred wheels in their place.

The Ladies Automobile Club.—At the first motor meet of the Ladies' Automobile Club of Great Britain and Ireland, which was fixed for Thursday of this week, a long list of entries was received, the cars assembling in the large open space of Carlton House Terrace, opposite Waterloo Place. Her Majesty the Queen had intimated that she would witness the passing of the "procession" past Buckingham Palace. The following are the members who entered for the meet:—Mrs. Ainslie, 16-h.p. Pritchett and Gold; Miss Antrobus, Electromobile; Mrs. Arthur Blomfield, 9-h.p. Orleans; Mrs. Claude Borrett, 10-h.p. Georges-Richard; Lady Brassey, electric brougham; Mrs. Buttemer, 10-h.p. Decauville; Mrs. Campbell, 18-h.p. Bardon; Lady Carbutt; Lady Colville, 6½-h.p. De Dion-Bouton; Mrs. Cross, 15-h.p. Napier; Mrs. Dawson, 22-h.p. Daimler: Mrs. Donner, 10-h.p. Panhard-Levassor; Mrs. S. F. Edge, 12-h.p. Napier; Mrs. Edmunds, 10-h.p. Panhard; Mrs. E. M. Edmunds, 9-h.p. De Dion-Bouton; Hon. Mrs. Tatton Egerton, 50 or 60-h.p. Panhard; Mrs. Elliot, 15-h.p. Panhard; Mrs. Foster, Electromobile landaulet; Miss B. Goldney, 12-h.p. De Dion; Mrs. Grant, 12-h.p. Lanchester; Mrs. Hall, 30-h.p. Wolseley; Mrs. Hartung, 9-h.p. James and Browne; Mrs. Ashton Jonson, 5-h.p. Locomobile; Miss A. Kenealy, 15-h.p. Darracq; Countess of Kinnoull, 14-h.p. Chenard and Walcker; Mrs. Gerard Leigh, 15-h.p. C.G.V.; Countess of Londesborough, 40-h.p. Panhard; Mrs. Manville, 14-h.p. Daimler; Lady Cecil Scott Montagu, 22-h.p. Daimler; Mrs. Montefiore, 7-h.p. Panhard; Mrs. Arthur Paget, Electromobile; Miss Pilcher, 12-h.p. Ariel; Hon. Mary Portman, 16-h.p. Clément; Mrs. Rawlinson, 15-h.p. Darracq; Lady Beatrice Rawson, 10-h.p. Peugeot; Mrs. Rendle; Mrs. Carpenter Rowe, 6½-h.p. Gardner-Serpollet; Mrs. Schiff, 24-h.p. Panhard; Miss Edith Schiff, 24-h.p. Panhard; Mrs. Chas. E. Shaw, 24-h.p. Star; Mrs. Studley, 16-h.p. Wolseley; Duchess of Sutherland, 24-h.p. Mercedes; Lady Viola Talbot, 12-h.p. Clement-Talbot; Mrs. Thrupp, 10-h.p. Renault; Mrs. Turnor, 15-h.p. C.G.V.; Mrs. Whiteley, Hooper electric; Mrs. Wightwick, 10-h.p. Dennis; Miss Woodhull, 20-h.p. Mercedes; Miss G. Wilson, 10-h.p. Panhard.

Mr. Owen J. Llewellyn has been gazetted Lieutenant to the Motor Volunteer Corps.

That the penalties usually inflicted on bicyclists for riding at night without a light are woefully inadequate is shown by the tragic case of Mr. N. H. Burden, who was killed near Coventry on Saturday night. He was riding a motor bicycle, and, it is stated, ran into one of these dangers of the road, was pitched headlong from his machine, and dislocated his neck. Who the cyclist was who, in this way, appears to have made himself a danger to the public, and, as it turned out, the cause of an actual tragedy, has not transpired. To think that automobilists are liable to a £20 fine for merely driving at excessive speed, and doing no harm to anyone, while those who fatally endanger themselves and others in the manner referred to above are only liable to a fine of 10*s*., is to call attention to another of the many absurd inconsistencies of our legislation.

The recent cab strike difficulties promise to have some effect in hastening the introduction of the motor cab. Motor cabs will, at any rate, not have to complain of inadequate custom. 125 of these vehicles are promised within the next three months. We hope the promise will be carried out.

In all directions the automobile is being brought into use for commercial purposes. In the photograph shown above is seen an Orion vehicle which is now being employed regularly for carrying milk from Pettygards Hall, Swaffham, to Caley's Chocolate Works, Norwich, a distance of over 26 miles each way.

OUR old friend, Sergeant Jarrett, appeared in a new rôle at Kingston Police Court last week. He was a witness for the *defence* of an automobilist alleged to have been driving to the public danger, &c. Sergeant Jarrett had often noticed the defendant driving on the Ripley Road, owing to the fact that he never wore goggles, and he gave him an excellent character as a careful driver, and had never seen anything to complain of in the manner in which he behaved on the road. Even the evidence of Sergeant Jarrett, however, failed to produce any effect on the Bench, and the defendant was "duly" convicted and fined £3. It may be of interest to our readers to learn that there is reason to believe that Sergeant Jarrett's animosity to the automobile is constantly stimulated by pressure from higher quarters. There is, it is rumoured, an official high in the police, higher even than the chief constable, who resides close to the sergeant's beat on the Ripley road. He is a horse enthusiast, and a violent anti-automobilist, and if any cars pass his premises at at all a high rate of speed, and Sergeant Jarrett fails to issue summonses against them, he "hears" of it afterwards. The predilections of this highly placed official have a great deal to do with the Ripley road police traps on which we have had to comment from time to time.

ANOTHER case of the hardship arising from the necessity the Motor Car Act imposes on magistrates of endorsing the licence of a convicted person, is provided by the case of the Rev. Arundell Whatton, who was last week fined 10*s*. for not having a number on his car, though even the magistrate admitted that the company who provided the car appeared to be to blame. Mr. Whatton considers his case a particularly hard one, as he is now placed in the position of being a second offender, with the corresponding dread of imprisonment hanging over him, but he observes that in several other instances licences have not been endorsed even for furious driving. That, however, we would inform Mr. Whatton, is one of the beauties of the Act; for excessive speed is just the one offence, conviction for which does not compel the magistrate to endorse the offender's licence. As we have said before, this section as to endorsing licences is one of the most absurd things ever passed through Parliament, as it inflicts frequent hardship, and obviously fails to embody the intentions of the framers of the Act.

IT appears that the cost of constructing the 6-cylinder Napier car is greater than was at first anticipated, so that Messrs. S. F. Edge, Limited, have now been compelled to raise the price of this high-class chassis to £1,150, for all future orders.

MESSRS. J. E. HUTTON, LIMITED, have now made arrangements by which their extensive works at Thames Ditton are at the disposal of automobilists for carrying out repairs of any magnitude. The plant at Messrs. Hutton's establishment has been entirely designed for motor-car work, and the special training in this class of work which their staff has had, should ensure in no small degree thoroughly efficient work being done to those who may find it convenient to place business in their hands.

MR. THEO MASUI, who controls the well-known Germain cars in this country, notifies us that he has just opened an extensive garage and repair shop at 8, Earl Street, Westminster, S.W. There is storage accommodation for about 100 cars, and the instalment of tools is such that practically any replacement or repair can be undertaken. The premises will be open day and night including Sunday, and tyres and spare parts for all makes of cars are to be stocked. Mr. H. Ramoisy, late manager of the London Motor Garage, will undertake the supervision of the establishment.

Manufacturers' and Agents' Obligations.—At Mortlake last week it was decided by the magistrates in a case brought against Francis A. Monro, a director of the Ranelagh Motor Company, that entries of usage of cars bearing manufacturers' numbers must be made in the book prescribed under the Local Government Board Regulations, immediately after or before the car goes out from the premises, even if, as in this case, the car is used on a Sunday.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published June 2nd, 1904.

11,224. T. CLARKSON. Automatic regulation of water supply for steam generators.
11,822. P. WESTALL. AND W. VON ALBERTI. Steam engine controlling apparatus.
12,942. F. NUNNS. Speed registering apparatus.
13,174. S. F. EDGE AND DION DUNLOP MOTOR COMPANY (LIMITED). Variable speed gear.
13,610. T. T. VERNON. Air deflectors or dust screens.
16,133. SOC. FRAN. CAIL. Exhaust arrangements.

Applied for in 1904.

Published June 2nd, 1904.

2,662. H. BAHRENSCHER. Support for motor cycles.
6,051. SOC. FAB. ITALIANA D AUTOMOBILI. Lubricators.
6,052. SOC. FAB. ITALIANA D'AUTOMOBILI. Igniting devices,
6,053. SOC. FAB. ITALIANA D'AUTOMOBILI. Carburettors.
6,132. H. CONTAL. Electric accumulators.
6,441. G. PETZEL. Explosion engines.
6,732, A. AND W. WRIGHT Aeronautical machines.
7,366. GANZ AND CO., BUDAPEST. Steam motor wagons.
8,110. J. CHILDS. Non-explosive oil cans.
8,152. G. J. COX. Cooling apparatus.
8,332. E. VAN MORSE. Spark plugs.

British Exports and Imports of Motor Cars, &c., for 1904.

Imports.

1904.	No. of Cars and Value.		Parts Value.	No. of Motor Cycles and Value.		Parts Value.
		£	£		£	£
January ...	335	102,866	17,906	51	1,528	2,218
February ...	538	185,499	21,496	87	2,971	1,983
March ...	492	169,166	20,741	178	5,774	1,818
April ...	559	170,757	31,742	141	4,498	1,891
May ...	530	224,129	28,216	121	3,964	2,001
TOTAL ...	2,454	852,417	120,101	578	18,735	9,911

1904	Exports, British and Irish make.						Foreign and Colonial Re-exportation.					
	No. of Cars and Value.		Parts Value.	No. of Motor Cycles and Value.		Parts Value.	No. of Cars and Value.		Parts Value.	No. of Cycles and Value.		Parts Value.
		£	£		£	£		£	£		£	£
January ..	55	25,168	3,470	78	3,000	619	35	9,223	1,011	7	249	226
February ...	65	23,913	4,280	73	3,147	234	43	18,854	1,186	11	320	45
March ...	55	24,064	5,221	49	1,787	516	43	19,756	3,230	3	98	78
April	42	15,119	5,272	65	2,249	668	37	13,859	4,057	17	549	208
May	30	10,954	6,169	56	2,146	423	21	10,062	2,061	5	218	100
TOTAL ...	247	99,218	24,412	321	12,329	2,460	179	71,754	11,545	43	1,434	657

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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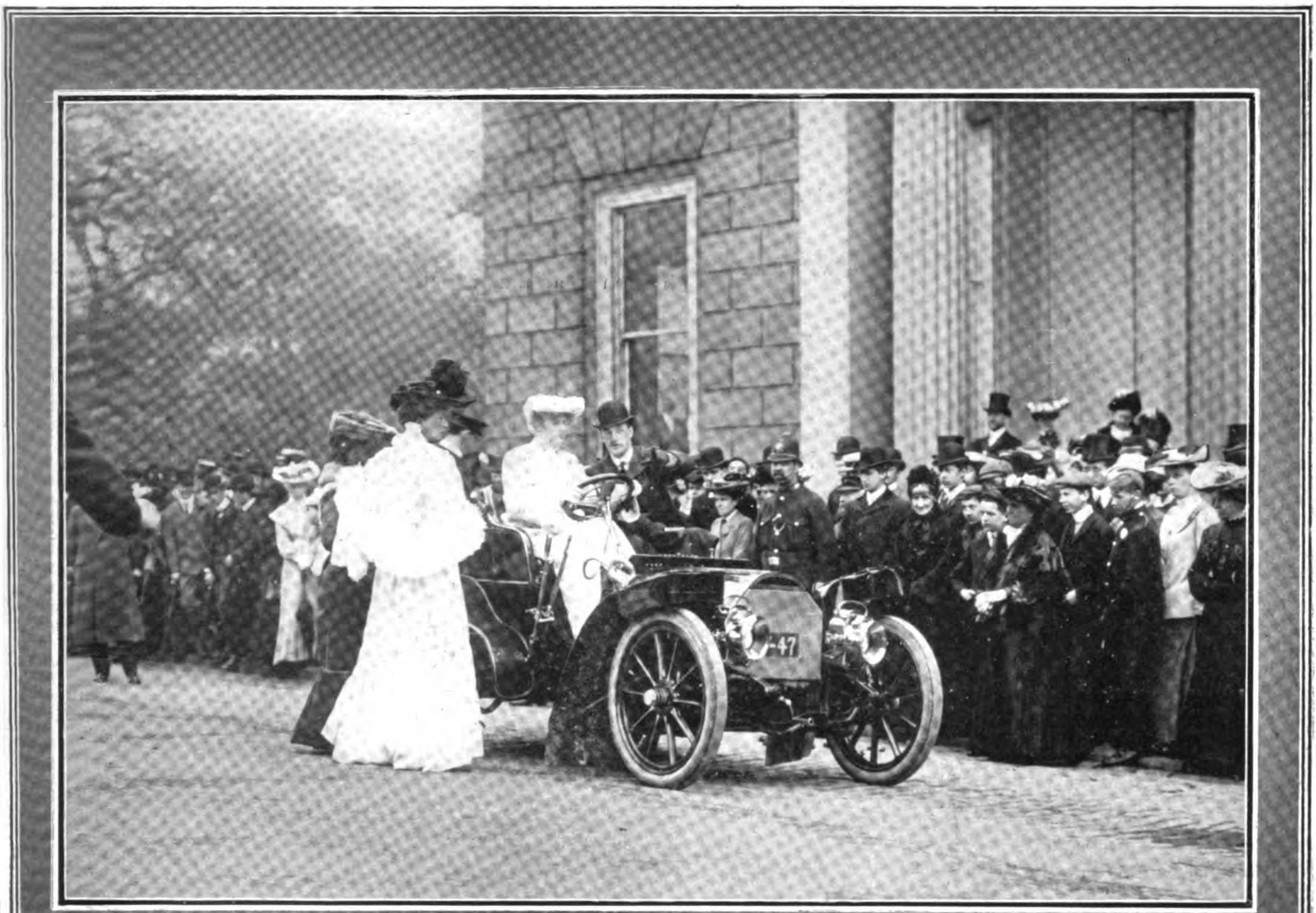

LADIES' AUTOMOBILE CLUB FIRST MEET.—On Thursday of last week the Ladies' Automobile Club held their first meeting, starting from Carlton House Terrace. The President of the Club, the Duchess of Sutherland, was present, and led off the cars down Pall Mall on their way to Ranelagh. The Duchess is seen in her car in our photograph accompanied by Mr. Eric Chaplin.

THE AUTOMOTOR JOURNAL.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
June 18 ...	Hill Climb (Hertfordshire A.C.).
July 2	100 Miles Passenger Trials (Motor Cycling Club).
July 9... ..	Driving Cup Contest (Derby A.C.).
July 23 ...	Sunrising Hill Climb (Midland A.C.).
July 26-27 ...	Reliability Trials for Motor Boats.
July 30 ...	British International Cup for Motor Boats.
Aug. 15-20 ...	Motor Bicycle Endurance Trial. (Auto Cycle Club).
Aug. 20 ...	Hill Climb (Derby A.C.).
Aug. 27 ...	Challenge Cup for teams of 6 (Motor Cycling Club).
Aug. ...	Hill Climb (Kent A.C.).
Sep. ...	Midland A.C. Speed Trials.
Sep. ...	Inter-Club Hill Climb, with Teams.
Sep. ...	250 Miles Trial (Motor Cycling Club).
Sept.	*Reliability Trials.
Sep. 10 ...	Lanark Hill Climb (Scottish A.C.).
1905.	
Mar. 3-11 ...	Liverpool Motor Cycle Show.
Apl. 1 ...	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

1904.	
June	Dourdan Kilom. Trials (*L'Auto*).
June 22 ...	Kiel Motor Boat Races.
July 10 ...	Mont-Cenis Hill Climb (A.C. Italy).
July	Speed Trials (*L'Auto*).
July 15-23 ...	Ostende Week.
July 15-20 ...	Ostende Motor Boat Races.
July 17 ...	Antwerp–Ostende Motor Boat Run.
July 25-26 ...	Circuit des Ardennes (A.C. Belgium).
July 26-Aug. 1	Spa Automobile Fêtes.
Aug. 8 9 ...	Calais-Dover-Calais (motor boats).
Aug. 10 ...	Calais-Boulogne-Calais (motor boats).
Aug. 14-20 ..	Paris–Deauville Motor Boat Race.
Aug. 18 ...	Semmering Hill Climb (A.C. Austria).
Aug. 22 ...	Motor Boat Race for Gaston Menier Cup.
Aug. 22-Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28 ...	Ventoux Hill Climb (Avignon).
Sept.	Deauville Automobile Meeting (*L'Auto*).
Sept. 2 ...	Chateau Thierry Hill Climb (*L'Auto*).
Sept. 10-12 ...	Lucerne Motor Boat Races.
Oct. 8 ...	Vanderbilt Cup Race (A.C. America).
Oct. 9 ...	Gaillon Hill Climb (*L'Auto*).
Oct. 14-22 ...	Leipzig Cycle and Motor Show.
Nov. 20 ...	100 Kiloms. Trial (A.C. Algeria).
Dec.	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

A Victim of "Last Across."

WE have frequently had occasion to draw attention to the terrible strain on the nerves of car drivers caused by the inane and idiotic pastime, known by London children as "last across," as well as on the danger to the children that practise it. At last it has claimed its victim, and the Coroner has had to consider the case of a little boy of five who was knocked down and killed on Thursday evening by a 10-h.p. Napier car belonging to the Hon. C. S. Rolls. Games on the highway, even if innocent, are offences under the Highway Act, and under that Act the police would certainly have ample power to stop this dangerous nuisance. Captain Annesley, who was one of the occupants of the car on the occasion in question, and gave evidence at the inquest, stated that the nuisance and dangers are rendered worse than they otherwise would be by newspapers offering prizes to children for obtaining the longest list of numbers of passing motor cars. The step from rushing into the roads to obtain the number of a passing car, to playing the game of "last across" in front of it, is a short one, and in any case the danger is almost equally great. There must be some method and reason in newspapers starting such idiotic competitions, but at present the only explanation we can suggest is that they are organised by anti-automobilists to render the life of car drivers as unhappy as possible, and promote accidents of the kind to which we refer above with a view to as far as possible inflaming popular opinion in the good old "Juggernaut" style.

◆ ◆ ◆

An Opportunity for a New Form of Police Trap.

THE beauty of the Vale of Llangollen ought, one would think, to make its inhabitants contented in their minds and amiable and good-natured to all their fellow-creatures. Unfortunately, some of them, at any rate, appear uninfluenced in this manner by their surroundings, and have developed a very acrimonious feeling against the automobile as an institution, and even against the humbler bicycle. As both these means of transit bring considerable custom to the town, this hostility is short-sighted. It is, however, the form which it has taken which is its least agreeable feature. The anti-automobilists of Llangollen have determined to attack the automobile (and the bicycle) in their most vulnerable part, and the roads in and through the little town have been recently fairly strewn with nails, screws reaching to three inches in length, and about 150 in number, while even the fair, though not in this instance exactly the softer sex, is reputed to have contributed a plentiful assortment of hairpins and hatpins. Altogether, a large basketful of articles of this description, evidently distributed for the purpose of injuring tyres, have, we learn from the *Manchester Daily Dispatch*, been picked up "within some 300 yards of the parish pump" of Llangollen. The clerk of the urban council has been confronted with them, and the clerk has handed the interesting objects on to the surveyor, while some action, we understand, though we know not what, is to be taken on the part of the police. Presumably, it would be of little use to point out to the acrimonious anti-automobilists of Llangollen the contemptible character of the tricks to which they have resorted. It may be more to the point to explain to them and those who may be tempted to indulge in similar diversion elsewhere, that to place any object on the high road for the purpose of injuring any vehicle passing along it is a criminal offence which may lead to the imprisonment of the perpetrator. At the same time, we would suggest to the local police that here is an excellent opportunity for employing the organisation of police traps in a new and more beneficent manner. The Llangollenites are not likely to distribute their 3-inch nails, screws, and other devices under the nose of a policeman, and if convictions are to be obtained we fear that the police will have to adopt some of the tactics they have brought to a fine art for the entrapment of the automobilist—on this occasion for his benefit. Let us hope that we may witness a fine display of impartiality on the part of the local police by the organisation of traps for the detection of those who distribute ironmongery on the roads in this way "with malice aforethought."

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The L.G.B. Decision in the Winchester Case.

THE application by the Town Council of Winchester for the introduction of the 10-mile speed limit for motor cars within the limits of the borough has received the same reply from Mr. Long on behalf of the L.G.B. that he gave to the Dover Corporation under similar circumstances. He will, that is to say, decide in neither of them until he has had further experience of other similar applications. In the meantime he does not consider that the Town Council has made out its case. Of course what Mr. Long and every unprejudiced person feels is that the stringent provisions of the present Act, and in particular the phraseology in regard to driving to the public danger, are, if anything, more than sufficient to safeguard the public, even in the most populous thoroughfares. To accede at the present moment to the request of such local bodies as have been so reactionary as to insist, not, it must be remembered, on the enforcement of the 10-mile limit merely in certain narrow streets, but over the whole of the areas which they control, would be to encourage similar applications from almost every local authority in the kingdom which happened to have a bare majority hostile to automobilism. This would lead to an enormous consumption of public time, the time of innumerable officials, and a preposterous waste of good ink and paper, while in any case the ultimate result would benefit nobody. After all nothing would be gained even by the most decrepit pedestrians by the introduction of the 10-mile limit, for in the towns where the narrowness of a few streets would justify its imposition, those streets are usually so narrow and tortuous that to drive at 10 miles an hour would still be dangerous to the public.

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Successful Competition by the Motor 'Bus.

No better evidence need be asked for of the successful competition with the municipal tram which motor 'bus services are not only likely to effect in the near future, but are actually now effecting, than is provided by the fact that in order to circumvent this form of opposition municipalities having tramway powers are contemplating the organisation of motor 'bus services so as to forestal possible competition in this direction. This, at any rate, is the step which the Worthing Town Council proposes to take, and which will probably be followed in a number of other instances. They are seeking to promote a Bill for the purpose. This action on the part of the Town Council is being hastened by the number of applications made on behalf of private persons to know if the Corporation will grant them licences to run private motor omnibus lines through the town. The situation suggests that it might be wiser on the part of the Corporations and Town Councils in many cases to defer the installation of expensive electric tramlines, and preferably to attempt to cope with the traffic by motor 'buses in the first instance. If the motor 'bus can become a serious competitor to an established tramway system it is obvious that the tram is likely to become something of a superfluity. It is a pity that the motor 'bus did not arrive at its present degree of perfection before so many attractive roads, particularly in the near neighbourhood of London, were disfigured by the unsightly overhead erections which provide current for the trams.

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To Diminish the Cost of Heavy Transport.

ONE of the most remarkable examples of industrial economy effected on a large scale has been illustrated in the case of iron works (situated mostly on the Continent) in which large gas engines, driven by blast furnace and coke oven gas, have been introduced to replace the steam engines whose boilers were formerly fired by the same gas supply. In some cases, where but 500-h.p. was obtained by the steam engines, the internal combustion engines have yielded 2,000-h.p. This enormous relative economy of the gas engine, as compared with the steam engine, is not quite maintained when we come down to the small sizes employed for traction purposes, but still the efficiency of the internal combustion engine, as compared with any form of steam engine, is very great. These considerations are of special interest to those members of the automobile industry concerned with the heavier types of vehicle designed primarily for goods transport, and to all manufacturers of motor boats. With them, cost of fuel is a very important consideration, and they would do well, therefore, to keep an observant eye upon the development of the gas producer in connection with the internal combustion engine—a development which we referred to shortly in a recent issue. In the case of stationary gas engines supplied with producer gas, a separate plant for raising the gas by means of forced draught produced by a steam jet has hitherto been the prevailing method adopted. As referred to in our issue of May 14th, it has now been found that the suction of the engine connected directly to the vessel of incandescent fuel, which produces the gas, enables the extraneous source of pressure to be dispensed with, and plants of this kind have been recently designed sufficiently compact to be applied to the propulsion of relatively small sea-going vessels. This M. Emil Capitaine, the inventor of the well-known marine motor that bears his name, has recently effected, and has introduced a variety of ingenious devices for getting rid of the tar and ash from the producer. There seems no reason why the same principle should not be employed in the case of heavy lurries. They would then be able to dispense with liquid fuel altogether. Needless to say, both their economy and independence would be enormously increased. Further development of the idea adapted for the propulsion of heavy lurries as well as of motor boats would seem to be a promising field for the exercise of invention.

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Changes at the Board of Trade.

ALL manufacturers and exporters, and automobilists consequently among the number, have a more or less direct interest in the efficiency and up-to-date constitution of the Board of Trade. To give only a single instance, the consular reports as to the state of trade, the conditions of markets, and the best methods of developing commerce in foreign countries, are sent in to the Board of Trade and edited for the *Board of Trade Journal*, in which they appear—usually at a time when the information they contain is a matter of historical interest only. Anyone, too, who desires to obtain a compulsory licence for a patent must apply to the Board of Trade, and it is the supreme authority in matters of shipping, railways and tramways, electricity, bankruptcy, statistics, trade marks and patents, and matters affecting labour. Considering this multiplicity of duties, it is not altogether wonderful that we and others should have to complain from time to time that the information it provides is not always quite modern, and that in other respects the body is not quite up to date. When it is called to mind that its constitution was arranged upwards of a hundred years ago by King George III., that when it was recently desired to find out who the members really were, the information had to be extracted from an Order in Council, dated 1786, and that among the members are *ex-officio*, the Speaker of the House of Commons and, as we remarked when the committee was appointed, the Archbishop of Canterbury, these peculiarities need excite no surprise. The notion of the Archbishop of Canterbury sitting on an enquiry into the conduct of a Captain of Mercantile Marine, presents humorous possibilities. The Board has never met for upwards of a century, and all the work has been done by the President of the Board and his permanent staff. Everyone, however, will welcome the abolition of this comic opera body, and the substitution for it of a real Board, the members of which would be in touch with the commercial interests of the country, who could frequently meet and be of real assistance to the President. This reform, it is now anticipated, will be carried out, as the result of the report of Lord Jersey's Committee, and it is also satisfactory to learn that the position of the Presidents, both of the Board of Trade and of the Local Government Board, are to be raised to that of the Secretaries of State, and their salaries increased from £2,000 to £5,000 per annum.

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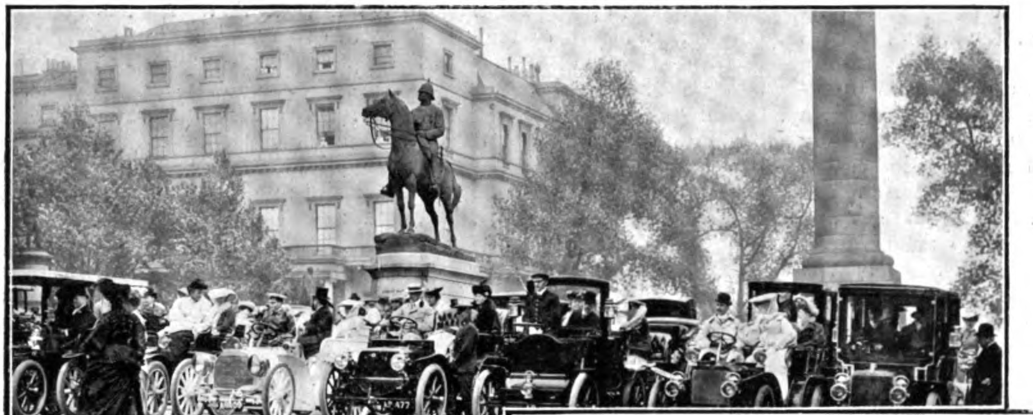
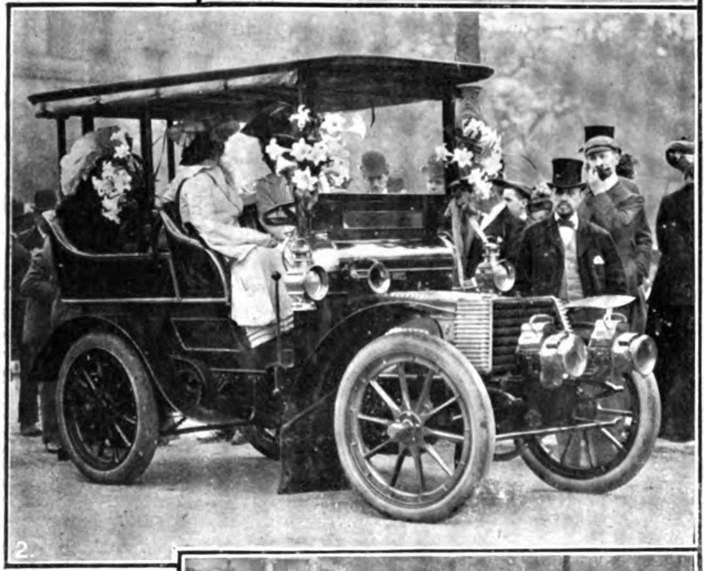
The Small Car Trials.

THE Reliability Trial of this year will be quite different from that of last year, and the years before. In the first place it will be restricted to light cars of £200 in price or under, and in the second it will be designed to ascertain pre-eminently which is the best and most reliable vehicle for ordinary everyday work, without the introduction of complicated formulæ or rules of procedure, tending, as they did last year, to limit the discretion of the judges and reduce them very largely to mere calculating machines. The Organising Committee have, as will be seen from the summary of the rules of the trials which we publish in another column, taken a great deal of trouble to devise the simplest possible set of rules for enabling the two principal objects mentioned above to be attained. The results ought certainly to prove of great use to, and be easily comprehensible by, the purchasing public.

It may be as well to draw attention to a few of the principal features of these rules. There will be four classes for the competitors, according to price. No competitor shall enter more than two cars, and unless these two differ by more than 20 per cent. in cylinder capacity, they shall count as a team, that is to say the marks will be averaged between them, and each car given the average. Prizes will be awarded for the greatest number of non-stop runs recorded in each class, while, in addition, other prizes will be given entirely at the discretion of the judges. The 600 miles to be run will be divided up into twelve non-stop runs of 50 miles each, two taken on each day, one 50 miles being run in the morning and the other in the afternoon, hill climbs being taken, if possible, during the run each day. The non-stop runs are regulated by strict rules. Any car that makes an involuntary stop of any kind on any particular run will fail to count that run as a non-stop. If it stops for a greater length of time than 20 minutes during any one run, or if more than 20 minutes is taken in adjustments or repairs prior to starting the run, it will be out of the non-stop competition altogether. Cars that are not ready to start by 11 o'clock each morning, or by 3 o'clock in the afternoon, and which do not get over their daily 100 miles by a certain time in the evening of each day, will be absolutely disqualified. But washing and a reasonable amount of time for replenishing and adjustment will be allowed after every run, though the time so occupied will be taken into account by the judges in their special awards.

Special care has been taken by the committee to render any misleading use of certificates by the competitors, after the trials, impossible, as every certificate will show the position gained by the competitor in the competition. It will be observed that the rules are exceedingly simple, and are well calculated to attain the end the committee have in view, of demonstrating what light cars can be relied on to run on ordinary roads at ordinary speed without breakdowns, while the public will be able to gauge the results practically at a glance. The club is, we think, wise in the present position of the industry in confining this year's trials to light, cheap cars. As London has had its fair share of recent Reliability Trials, the decision to conduct the Light Car Trials from one of the Midland towns as a centre has also much in its favour.





1. The first row of Cars. 2. Mrs. Manville's decorated Daimler Car. 3. Mrs. Gerard Leigh's Car, one of the Vice-Presidents of the Club. 4. Interchange of compliments before the start. 5. The Cars moving off for Ranelagh.

LADIES' AUTOMOBILE CLUB MEET.

THE LADIES' AUTOMOBILE CLUB MEET.

LADIES' AUTOMOBILE CLUB MEET. — The Duchess of Sutherland, the President of the Club, on her Mercedes Car prior to the start.

LADIES' AUTOMOBILE CLUB MEET.—Right Hon. Henry Chaplin, who was present at the Meet, has a chat with the Duchess of Sutherland.

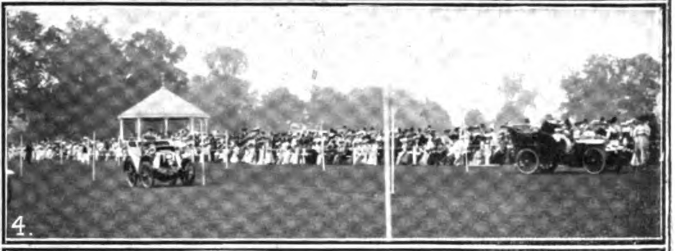
UNDER none too promising weather conditions, a very successful gathering was held of members of this club on Thursday last week. The point selected for meeting was in Waterloo Place, and a few minutes to 3 o'clock the first cars commenced to arrive, ranging themselves in lines across the square, commencing on the side by the Athenæum Club. By a few minutes after three, some half a dozen cars had taken up position, and caused a very considerable crowd to assemble. After this, smart vehicles with smarter occupants succeeded each other rapidly up to the last moment announced for the start—3.30. One of the earliest arrivals was Mrs. Manville on her splendid Daimler carriage. She had tastefully decorated her car with beautiful bouquets of flowers, in which lilies predominated, and, needless to say, the car was a centre of considerable attraction even in the mass of well-appointed automobiles which helped to make up the imposing assemblage. The president of the club, the Duchess of Sutherland, and the vice-presidents of the club, were allotted the front row of the cars, and the Duchess, showing a good example, was in place driving her own car by 3.15. The occasion was an excuse for quite a fashionable little gathering, and on all sides friends greeted friends, and congratulated each other upon the striking gathering which had resulted for the inaugural meet of this successful club. In all nine ladies were driving in the procession, which moved away from the square punctually at 3.30, just half a hundred cars taking their turn down Pall Mall *en route* for Ranelagh, passing Buckingham Palace, where the Queen had specially arranged to witness the passing of the parade. Amongst those who were prominent and chatting with old friends was the Right Hon. Henry Chaplin, who has done so much to help automobilists towards gaining a certain amount of consideration at the hands of Parliament.

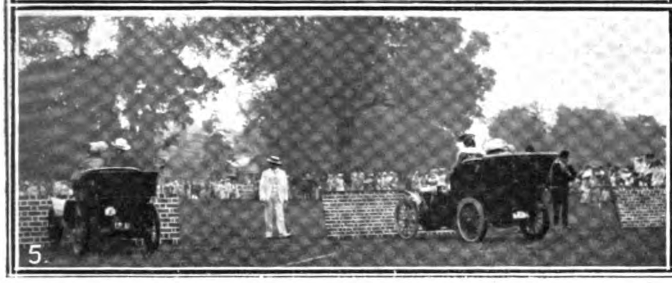
Admirable arrangements were made by the police to prevent the smallest hitch in the proceedings, and the crowd was tactfully handled from the commencement by the two inspectors in charge of the proceedings.

The whole of the entered cars, of which we gave a list last week, took part in the run, with the exception of Mrs. Hall's 30-h.p. Wolseley and Miss Edith Schiff's 24-h.p. Panhard. In addition, we learn from the secretary of the club, the following ladies participated in the meeting :—Mrs. Chas. Hunter (20-h.p. Wolseley), Mrs. Copland, Mrs. T. B. Browne (14-h.p. James Browne), Lady Burrell, Miss Eastwood, Mrs. Elliot (of Clifton Park), Mrs. Edward Hannen, Mrs. Kellgren, Mrs. C. M. Lloyd, Mrs. Lindsay-Lloyd, Mrs. Morrison, Mrs. Bruce Porter, Lady Rodney.

Although the sky continued to have a somewhat threatening appearance, fortunately for the elaborate toilets displayed no rain actually fell, and the run to Ranelagh was most successful. When drawn up in the grounds at Barn Elms, the cars and their occupants presented an even more attractive appearance than at the start.

MOTOR GYMKHANA AT RANELAGH.





1. Mr. C. F. Torrey, No. 18 (10-h.p. Wilson and Pilcher), waiting his turn to start in the "Ladies' Passenger" Competition.

2. Mr. Torrey dropping a passenger in the race.

3. Ladies' Race.—Mrs. Geo. H. Thrupp has a "walk over" on her 10-h.p. Renault.

4. Bending Race.—Mr. J. D. Restler, No. 12 (7-h.p. Panhard), and Mr. A. Rawlinson, No. 10 (30-h.p. Darracq), coming up the course.

5. Starting and Stopping Handicap.—Mr. H. Langrishe, No. 8 (10-h.p. Panhard), and Mr. A. Rawlinson, No. 10 (30-h.p. Darracq), stopping at the "brick wall."

6. The Appearance Competition.—The Cars in line undergoing the scrutiny of the Judges.

MOTOR GYMKHANA AT RANELAGH.—SATURDAY, JUNE 11TH.

A LARGE and fashionable crowd was present to witness the Automobile Gymkhana which took place on Saturday last at Ranelagh. Seven events were down for competition, and altogether 19 entries were received, but unfortunately several of the entered cars did not take part in the sports, the field being, therefore, very thin in several of the races.

The first event was a "Coach-house" Handicap. This was a competition to get a carriage out of a coach-house from an awkward position, and, on return, turn the carriage inside the coach-house. Cars had to start within an enclosure, with their front wheels on a line at one of the far corners of the enclosure. Cars had to be manœuvred and to pass, front wheels first, out of the entrance; to race to a point 50 yards off and back, passing through a gate twice. The driver, in passing through the gate, had to alight, open the gate, re-enter his carriage, drive carriage through, alight, shut the gate, and return to his carriage. Then re-enter the enclosure, front wheels first, manœuvre, and turn until the front wheels of the car were in the entrance and the rest of the car inside the enclosure. Driver then alighted, stopped the engine, leaving all safe for the night, and came out of the enclosure. The handicapping was effected by altering the size of the enclosure. The winner was Mr. J. D. Restler, 7-h.p. Panhard; 2nd, Mr. H. Langrishe, 10-h.p. Panhard.

The next event was a bending race for motor carriages, which consisted of driving in and out between staves. Winner, Mr. A. Rawlinson, 30-h.p. Darracq; 2nd, Mr. H. Langrishe, 10-h.p. Panhard.

Ladies' Race and Motor Carriages Handicap.—In this, lady drivers had to be accompanied by a lady, but the engines were allowed to be started by an attendant. Of the four competitors entered, only Mrs. Geo. H. Thrupp was present, with her 10-h.p. Renault. This, therefore, resulted in a walk-over.

Motor Carriage Handicap Race, twice round the course.—Winner, Mr. Claude Johnson, 12-h.p. Orleans; 2nd, Mr. A. Rawlinson, 30-h.p. Darracq.

Ladies' Passenger Race (handicap), for four-seated carriages.—In this, competitors had to drive 100 yards; alight; assist a lady from her chair on to the front seat of the carriage; reseat himself; drive a

MOTOR GYMKHANA AT RANELAGH.—Mr. R. A. Rawlinson, who was the chief winner in the various events on Saturday last, on his Darracq Car. During the intervals between the contests, Mr. Rawlinson was taking part in the polo matches which were going on at the same time at Ranelagh.

further 100 yards, alight, and assist a second lady from a chair to the back seat of the carriage. Driver to then retake his seat, drive another 100 yards, and assist a third lady to the back seat of the carriage. Then remount and drive to the finishing point. The ladies were not allowed to rise from their chairs until the driver took them by the hand to assist them from their chairs. After placing each lady in the car, the door of the tonneau had to be properly shut. Winner, Mr. A. Rawlinson, 30-h.p. Darracq; 2nd, Mr. C. F. Torrey, 10-h.p. Wilson and Pilcher.

Starting and Stopping Handicap.—In this the cars were required to start from a line, race over a straight course, and terminate over a line, but without touching a "brick wall" placed just beyond the line. In this Mr. A. Rawlinson was again successful on his 30-h.p. Darracq.

The final event was the competition for appearance, the awards being made for the car and occupants in conjunction. Twelve entries were received, and the winner was Mr. C. F. Torrey, Mr. Walter Foster being second with his 24-h.p. Georges-Richard car.

The Duchess of Sutherland subsequently distributed the prizes to those who had won the various events.

IMPORTANT STATISTICS OF THE FRENCH AUTOMOBILE INDUSTRY.

OUR contemporary, *Le Velo*, has been at considerable trouble in drawing up a statement in regard to motor cycles and automobiles in France for the year 1903. The figures published by our contemporary show that in France on December 31st last there were 1,310,223 ordinary cycles, 19,816 motor cycles, and 19,886 automobiles. Included in motor cycles are tricycles, quadricycles, and motor bicycles. These figures show that there is in use one cycle per 30 inhabitants, one motor cycle per 1,966, and one automobile per 1,959 inhabitants, and, further, the proportion gives 66 cycles for every motor cycle and 66 cycles for every automobile. The estimated value of the motor cycles (at 700 fr.) is 13,871,200 fr., and the automobiles 171,130,000 fr., allowing 10,000 fr. per machine for 14,340, and 5,000 fr. for 5,546. These machines bring a revenue into the Government of a quarter of a million francs for the motor cycles, and 1¾ millions for the automobiles. Dealing with the motor cycles, it is curious to note the manner in which these machines are distributed in the country. Paris comes first with 5,337 machines = 26·9 per cent., then the Northern district 3,036 machines = 15·3 per cent., followed by East, 1,919 = 9·7 per cent.; N.E., 1,862 = 9·4 per cent.; W., 1,837 = 9·3 per cent; S.E., 1,484 = 7·5 per cent.; Centre, 1,456 = 7·4 per cent.; N.W., 1,312 = 6·6 per cent.; S.W., 968 = 4·9 per cent.; S., 599 = 3·0 per cent. In the automobiles the order of percentage is slightly different, as follows: Paris, 6,085 = 30·6 per cent.; North, 3,040 = 15·3 per cent.; East, 1,995 = 10·0 per cent.; S.E., 1,650 = 8·3 per cent.; N.E., 1,617 = 8·1 per cent.; W., 1,411 = 7·1 per cent.; Centre, 1,315 = 6·6 per cent.; N.E., 1,127 = 5·7 per cent.; S.E., 962 = 4·9 per cent.; S., 681 = 3·4 per cent.

Another interesting feature is brought out showing the following statistics for the last four years of 1 or 2-seated vehicles, and vehicles with more than 2 seats in use:—

Year.	1 or 2 places.	Over 2 places.	Total.
1899	946	726	1,672
1900	2,402	2,884	5,286
1902	2,512	4,748	7,260
1903	5,546	14,340	19,886

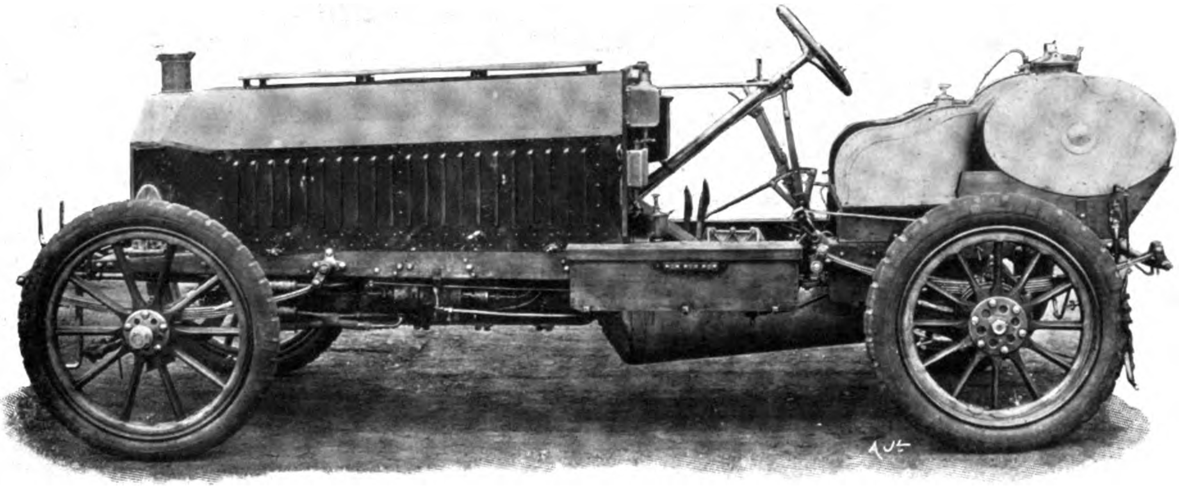
In continuation of these figures it is estimated that at the present moment there are 25,000 automobiles in France, and by December 31st next that there will be from 28,000 to 30,000 in use. These figures only deal with the vehicles which are actually in the country, and do not allow for exportation. Some idea of how this latter item will further swell the foregoing progressive figures may be gathered from the following values of the exports from France:—

Year.	Francs.	Year.	Francs.
1897	623,690	1900	9,417,360
1898	1,749,350	1901	15,782,290
1899	4,259,330		

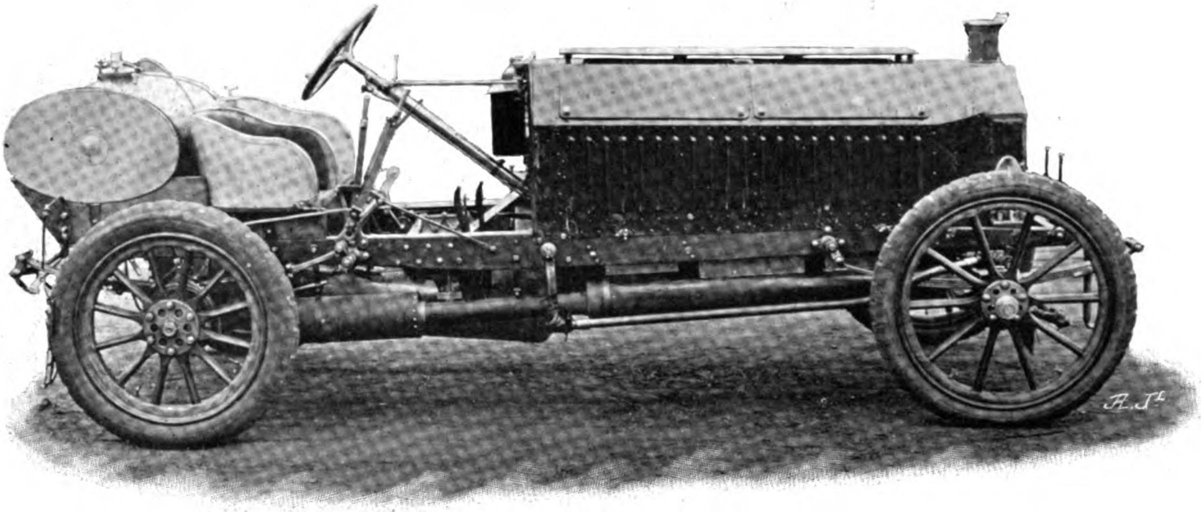
For 1902 the figures are given as 30 millions, and for 1903 they are estimated at 50 millions in round figures. It will be noticed that the number of cars with more than 2 seats is advancing at an enormous rate over the 1 or 2-seated vehicle. By way of a summary the following figures for the three types of machines are given for the period December 1900-1903:—

	Number of machines in 1900.	Number of machines in 1903.	Increase in 3 years.
Cycles	975,878	1,310,223	34 per cent.
Motocycles	11,252	19,816	76 per cent.
Automobiles	5,286	19,886	276 per cent.

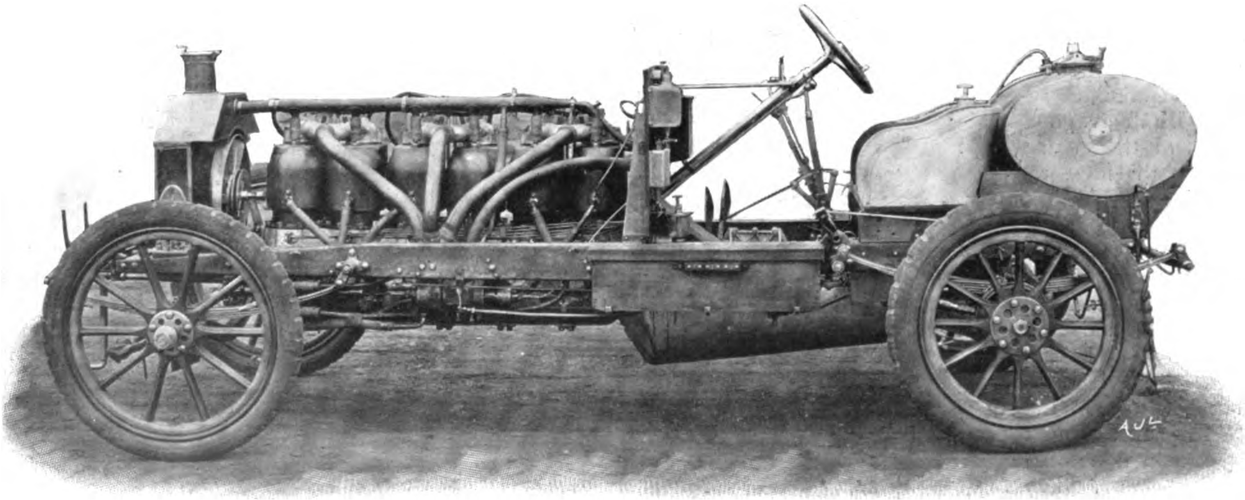
THE SIX-CYLINDER NAPIER RACER.



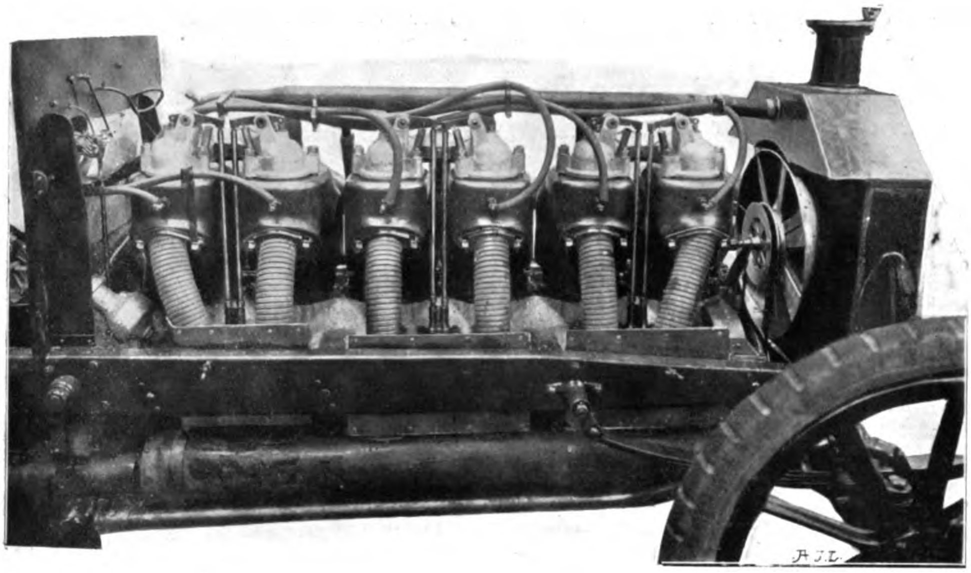
The Six-Cylinder 80-h.p. Napier Racing Car in running order.



View of the Six-Cylinder Napier Racer from the Off-Side.



View, from the Near Side, of the Six-Cylinder Napier Racer with its Bonnet removed.

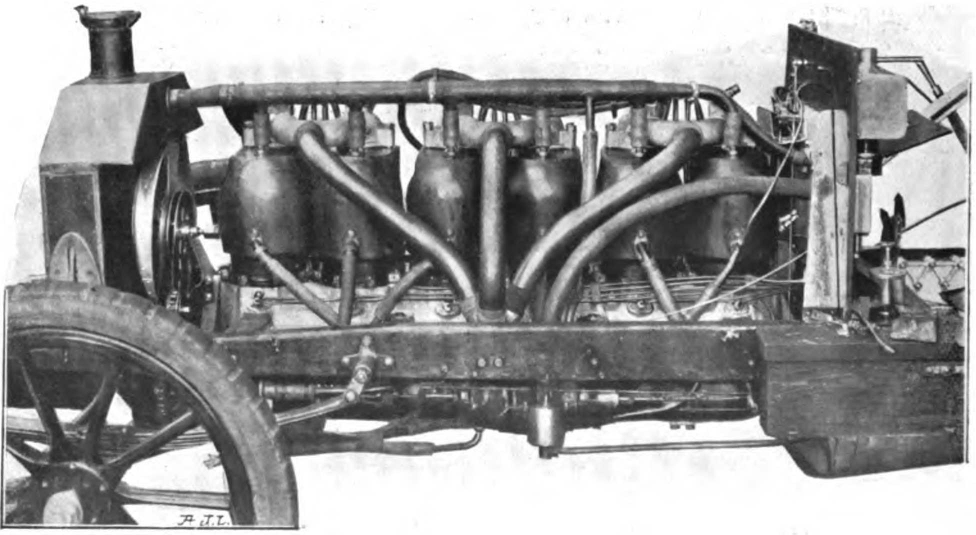


The Six-Cylinder Engine on the Napier Racer, as seen from the Off-Side. Showing the mechanically-operated inlet-valves, the flexible exhaust pipes, the ignition plugs and the spiral gear that drives the ignition apparatus on the dashboard.

THIS powerful racing car, which is the latest production of the Napier works, has many interesting and novel features, which render it very different from any of the other big racers hitherto constructed. Chief amongst these is the employment of six separate cylinders, having electrolytically-deposited copper jackets, and mechanically-operated inlet-valves, and the adoption of an unusually small change-speed-gear, which provides only two forward speeds.

As will be seen from our illustrations, the engine occupies fully one half the length of the chassis, and the driver's seat—with the large petrol tank high up immediately behind it—is practically situated over the back axle. The front axle, too, is well forward, beneath the radiator, so that the weight appears to be well distributed upon the four wheels. It will also be observed that the filler caps, both for the petrol tank and above the radiator, are of considerable size, and are provided with rapidly-detachable locking devices.

Amongst our illustrations, the three which show the car with the bonnet removed, and give good views of the engine from both sides, respectively, enable a clear idea of the general construction (particularly of the engine and the frame) to be obtained at a glance. It has a pressed steel main frame, and the springs supporting it are shackled in much the usual way. The engine and the gear are fixed direct to it, and the car is, of course, of the live-axle type. The engine is normally of 80-h.p., though there can be but little doubt that it is capable of developing considerably more power than that. Its six cylinders, which are made of steel, are independently bolted to the aluminium crank-chamber, which is made in one piece. The jacket around each cylinder is formed by depositing copper electrolytically around it; the steel cylinder being, for this process, covered with wax which is coated with plumbago to give it a conducting surface, and is melted out ultimately to leave the water space. The inlet-valves, which are of the annular type, are mounted in precisely the same position that atmospherically operated valves usually are — immediately above and facing the exhaust valves. They are, however, actuated by cams, on the same cam-shaft as those which lift the exhaust-valves, and are for this purpose fitted with small rocking levers, which engage with the upper ends of long vertical push rods. The ignition plugs, which are of the high tension type, lie horizontally, and pass through the sides of the valve chambers, between the valves. A special feature of the engine is the construction of the crank-shaft and of the connecting-rods, all these parts being hollow throughout their length. These portions constitute some of the best examples of high-class workmanship which have ever been turned out by the Napier factory.



View from the near side of the Six-Cylinder Engine on the latest Napier Racer.

The carburettor, which lies on the near side of the engine, is water-jacketed, and three induction pipes lead from it—one to each pair of cylinders. It is fitted with the makers' latest throttling arrangements, and with their hydraulic air-regulator by which, it will be remembered, the pressure of the water in the cooling system is made to give the necessary automatic control. The throttle valve is subject to hand regulation from a small lever mounted above the steering wheel, and it is this lever which primarily controls the speed of the car.

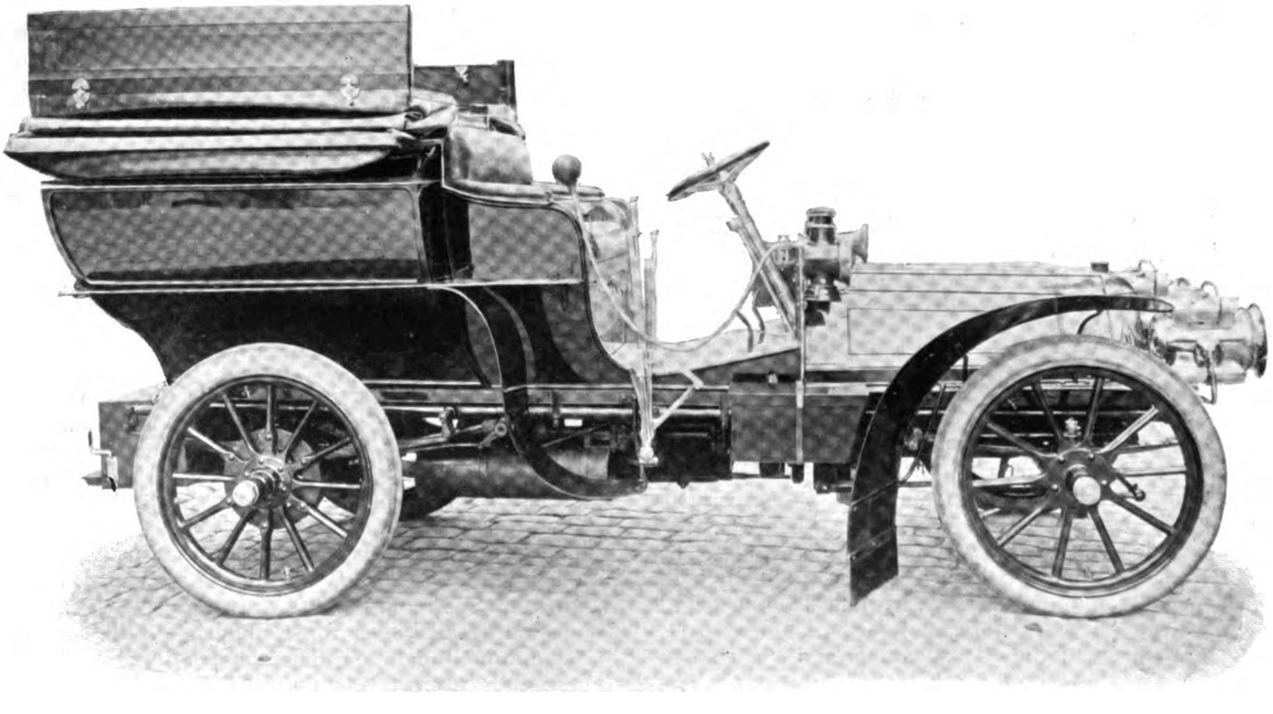
The ignition system, which employs only one coil and trembler for all the cylinders, is practically the same as on the makers' latest touring cars, and was described very fully by us recently (16th April, p. 469). It is mounted on the dash, and its two revolving spindles are, on this racer, driven by spiral gearing instead of by a chain and spur-wheels. The timing lever passes horizontally across to the steering pillar as on their other cars.

Separate exhaust-pipes are led from each cylinder to a large expansion-box, lying on the "off-side" close to the engine. These pipes are made of flexible tubing to allow for any unequal expansion of the different metals, and there is another exhaust-box into which the gases are subsequently led.

The cooling water is circulated through the radiator by a pump of large size, which is driven at a comparatively low speed, and there is a belt-driven aluminium fan mounted immediately behind the radiator. This radiator is built up of a large number of very thin tubes, which are fluted in order to increase both their cooling surface, and the water space between them. The water is forced through each of the jackets independently, and the pipe connections are made with rubber tubing to give the necessary flexibility.

The main clutch appears to be of much the same construction as on other racing cars of this make. It has metal to metal friction surfaces and is normally held in engagement by three independently adjustable springs; it is self-contained so far as end thrusts are concerned.

As already mentioned, the gear-box is exceptionally small, and only provides two forward speeds, which are found to be all that is necessary, owing to the flexibility and high power of the new engine. We are informed that the car weighs just over 19 cwt., that it is expected to attain a very high speed, and that one of the chief objects of the designer has been to build a car capable of exceptionally rapid acceleration when starting.



Lord Moreton's New Ariel Car.—This handsome vehicle is one of the 20-h.p. Ariel "Lonsdale" Wagonettes, and is constructed on particularly pleasing lines, having a seating capacity for six persons. The hood, which is divided down the middle, folds sideways, and when up affords complete protection for those inside the wagonette.

OPPONENTS of automobilism are certainly not very well advised in their arguments. Dr. Farquharson, who objected in the House of Commons to what he was pleased to term the invasion of Hyde Park by motor cars, on the ground, amongst others, that the fumes of "petroleum" (*sic*) contaminated the air, is taking a doubtful line. For years past the medical profession has been attacking the horse as a leading cause of the impurity of our great cities. Dr. Farquharson ought to have been the first to recognise that in an argument of this kind comparisons are really "odorous."

THE "FORD" PETROL CAR.

(*Concluded.*)

The Engine.

A SIDE-VIEW of the engine, fixed in place on the car, is given in Fig. 6, and this illustration, taken in conjunction with those of the chassis already referred to, will enable its construction to be clearly understood. It has two horizontal cylinders, F, which are bolted, slightly out of line with one another, on opposite sides of the crank-chamber. Each cylinder casting forms a large valve chamber beneath the cylinder proper, and there is a large water-jacket around the entire combustion-chamber. Although the cylinders are not in line with one another, yet their valve-chambers are so arranged as to be quite opposite, and the valves, being horizontal and pointing towards one another, can therefore be operated by the same cams. The inlet and exhaust-valves in each valve-chamber lie alongside one another, in such a way that the inlet-valve, G^6, of the one cylinder is in line with the inlet-valve of the other, and the two exhaust-valves, H^3, are also in line. Inspection plugs, G^5 and H, respectively, are screwed into the valve-chambers opposite to the inlet and exhaust-valves, so that any valve can be readily got at for grinding in when necessary; the inspection-covers, G^5, have the ignition-plugs, J^1, screwed through them. All four valves are normally held on their seats in the usual way, by helical springs, and they are operated by horizontal push-rods that pass through the base of the crank-chamber and engage with the two cams on the cam-shaft lying therein. The cylinders have a bore of 4¼ ins., and the stroke is 4 ins.

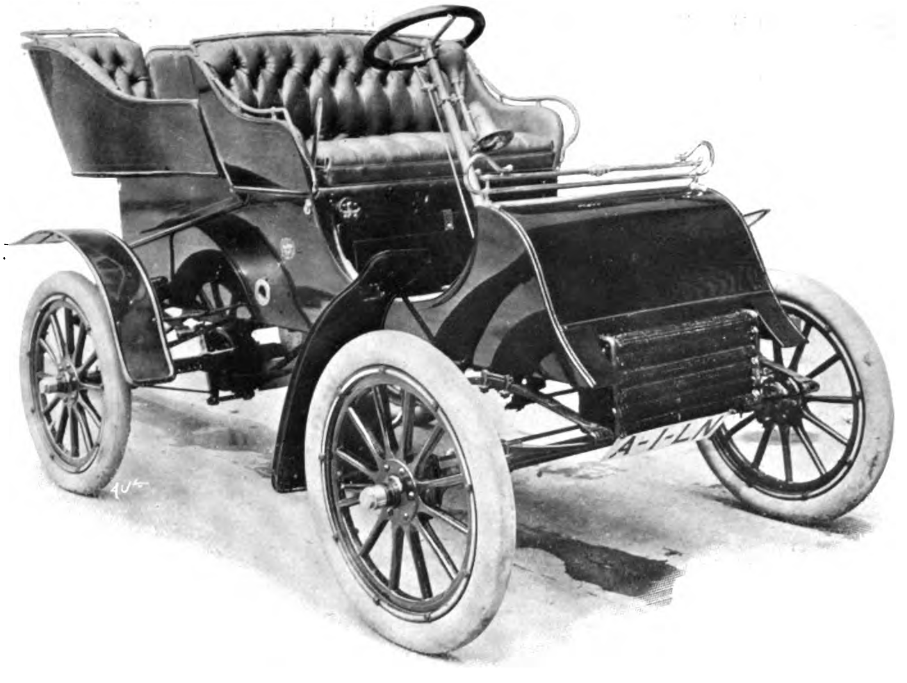


FIG. 5.—Another View of the "Ford" Petrol Car, fitted with its Tonneau.

The crank-chamber proper is formed of two castings, F^1 and F^2, the joint between which is horizontal, and lies above the crank-shaft bearings. The lower casting, F^1, is slotted at each side to receive the bearings, which are made in two parts—divided vertically—and are forced up together by a wedge which can be tightened up against them from outside. The upper casting, F^2, is provided with a flat cover plate, F^3, to which is fixed a large sight-feed lubricator, L, which feeds the engine at six different points. The crank-shaft has two crank-pins arranged opposite one another, with only a thin cheek between them, and the two connecting rods, acting upon them, are quite straight. The reciprocating parts are in this way mechanically in balance, and the two pistons reciprocate in opposite directions to one another. The valves are so set that the two cylinders do not fire at the same time, but work alternately, and thus an impulse is given to the crank-shaft at the same moment during each revolution, thus also securing balance so far as regularity of impulse is concerned.

The crank-shaft is carried in bearings of large size, which are kept as near together as the cranks permit, but there is a spur-wheel between the crank and the bearing on the right side for driving the cam-shaft, which lies immediately below the crank-shaft. The cam-shaft and the spur-wheels driving it are thus kept well lubricated, since they lie inside the crank-chamber, and, as we have already said, the cam-shaft has only two cams formed on it, the one for actuating the two inlet-valves, and the other the two exhaust-valves.

The connecting rods have adjustable bearings at both ends, and their big-ends are so formed that only one bolt is required for holding the cap in place, the cap being hinged to the connecting rod on the underside.

The lubricator, L, is of larger size than usual, and is fitted with a filler cap, L^1, which—like the caps, G^1 and K^1, for the petrol and the water respectively—are readily accessible at all times for replenishing. There is a passage formed between the crank-chamber and the top of the lubricator, through the fitting which holds the latter in place, and a non-return valve is introduced in this passage. By this means a certain amount of pressure is, whilst the engine is running, maintained on the oil, because the two pistons tend to compress the air in the crank-chamber when travelling inwards, and to draw in a fresh charge of air when travelling outwards. Since the pressure is only maintained whilst the engine is running, its lubrication is to a great extent automatic. Each of the six feed pipes, leading from it, has a separate adjustment, and the oil to each drops through a short length of glass tubing. Two of the pipes feed the two pistons, two of them lead to the main-crank-shaft bearings, and the other two drip on to the connecting rods.

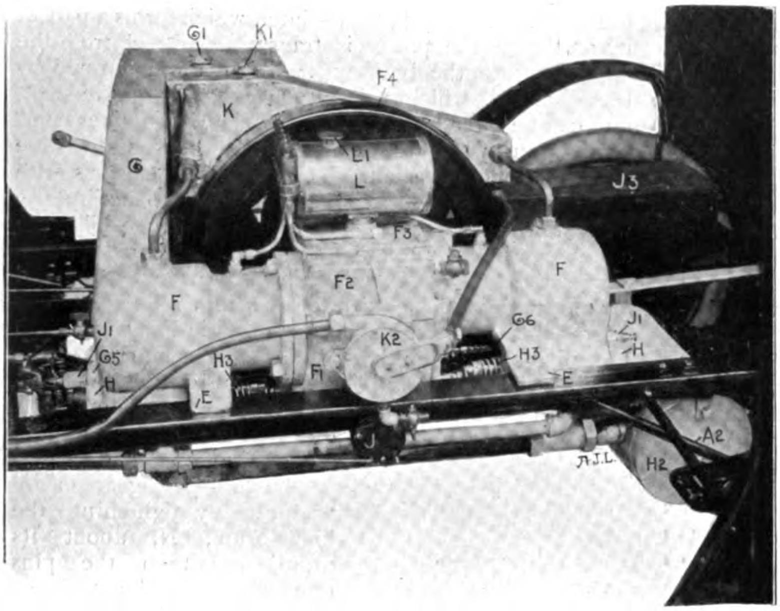


FIG. 6.—The "Ford" Engine, as seen from the "near" side of the chassis.

The commutator, J, is fitted just outside the crank-chamber on the projecting end of the cam-shaft, where it lies at the side of the car in a very convenient position. It has but one contact spring inside it, and is used in conjunction with a single trembler coil, which is fixed beneath the front seat on the left. The cam operating the commutator has two opposite projections, so that the low-tension circuit is completed to the coil twice—at equidistant points—during each revolution of the cam-shaft. The high-tension coil has both its terminals insulated, and the two high-tension wires are led to the two ignition plugs, J^1. Electrically, therefore, the ignition plugs are in series with one another, and the spark occurs in both cylinders simultaneously, although only required in one at a time. The idle spark in the other cylinder merely takes place towards the end of the exhaust stroke, and therefore does no harm. The advantage of this arrangement, which is already known to our readers—as, for instance, in the twin-cylinder Chenard-Walcker car—is that one coil serves for two cylinders, and that perfect synchronism between cylinder and cylinder can be ensured. The commutator is, as usual, so mounted that it can be rocked about the cam-shaft, for varying the time of ignition in the cylinders, and this "timing" is controlled from a hand-lever on the steering pillar.

The type of carburettor, G^2, employed, is of the float-feed spray variety, and it is fixed (Figs. 2 and 3) almost centrally in the car just in front of the engine. It is of very simple construction, and with it is combined a throttle-valve that is connected by a system of levers, G^3, with a foot-pedal. The throttle-valve is normally held almost closed by a spring, but can be opened to any desired extent by depressing the pedal correspondingly. The float itself, in the carburettor, is made of cork, and is varnished to prevent any disintegration. The valve which cuts off the petrol feed to the carburettor is fixed direct to the upper side of the float. An adjustment, in the form of a needle-valve above the spray jet, is provided for enabling the richness of the mixture to be determined initially, and there are also adjustable screw stops by which the range of movement of the throttle-valve can be limited in both directions. The throttle-valve is so made that an approximately constant richness of mixture is maintained by it, for it not only controls the flow of the mixture to the engine but also of the air to itself. The entering air is in no way warmed, but is drawn straight in beneath the mixing chamber.

A comparatively long, branched induction pipe, G^4 (Fig. 3), leads the explosive mixture, on the underside of the engine, to both inlet-valves, and this pipe is designed in such a way as to ensure both cylinders obtaining an equal volume of charge.

The exhaust-pipe, H^1, lies alongside the induction-pipe, G^4, underneath the engine, and into it the exhaust gases from both cylinders are led direct. This pipe is clearly visible in Fig. 6, where it will be noticed that the gases have but a very short distance to travel to the exhaust box, H^2. The exhaust-box appears to be very effective, although comparatively small for an engine of this power; it is constructed with four concentric tubes that form annular spaces into which the gases are successively led through rows of $\frac{5}{16}$-in. holes.

The circulating-pump, K^2, which is of the centrifugal type, is driven direct off the left end of the crank-shaft. It draws its supply of water from the bottom of the tank, K, and forces it up through the radiator, K^3, on its way to the cylinder-jackets. The water enters the bottom of each jacket, and is led back again from the top of each to the tank, K. The radiator is constructed of eighteen finned tubes which are arranged in six rows of three, placed one above the other. The water enters the bottom, and passes through each row of tubes in succession to the top, the tubes in each individual row being

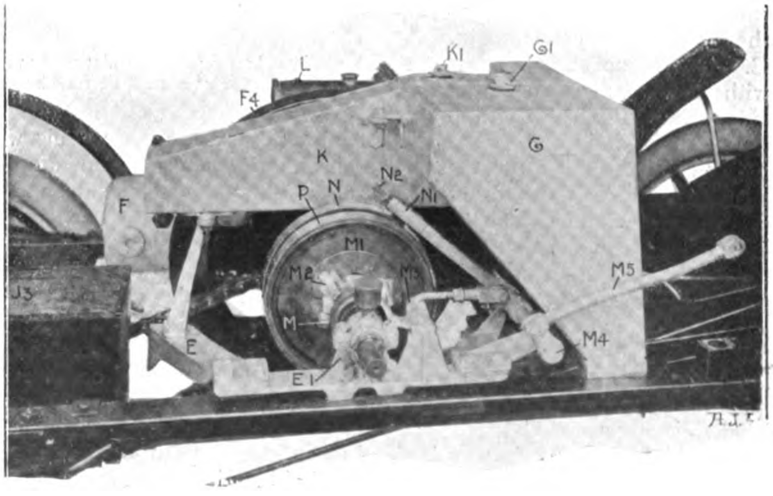


FIG. 7.—The Change-speed-gear on the "Ford" Car, as seen from the "off" side of the chassis.

connected in parallel. This radiator appears to be sufficiently effective to prevent any loss of water by evaporation when the car is running normally and continuously.

The flywheel, F^4, is of large diameter, and is sufficiently heavy to ensure steady running. It is mounted close up to the crank-chamber, and the crank-shaft projects through it right across the chassis to the right side, the change-speed-gear being mounted on it. The crank-shaft at its extreme end, just outside the bearing, E^1, is fitted with a pin, F^5, to receive the starting handle, and it will be observed, in Figs. 1 and 5, that the handle is introduced through a hole in the side of the body. As a matter of fact, it is possible to start the engine from the driver's seat, and, as a comparatively low compression is arranged for in the cylinders, it is not difficult to turn it round. Usually, however, the engine is started from the ground.

The engine is capable of developing about 10-h.p., and it actually gives, we understand, 9-b.h.p. at about 800 revs. per min., which is considered to be the normal speed. In practice it runs at any speed up to about 1,400 revs. per min., and appears to do so without setting up any objectionable vibration.

The Change-speed-gear.

The type of change-speed-gear used on the Ford car is sufficiently similar to that employed on other American vehicles to render superfluous any very full description here, but it differs from others, inasmuch as no internally-toothed gear-wheels are used in it. Mounted freely on the crank-shaft, close up to the flywheel, F^4, is the sprocket-wheel from which the power is taken to the back axle by the chain, C. This sprocket is formed with deep flanges on either side, and the gear ratio between it and the back axle is about $3\frac{1}{8}$ to 1. Fixed rigidly to this sprocket is a spur-wheel, immediately outside which are two other spur-wheels that are also concentric with the crank-shaft. The central spur-wheel is somewhat smaller than the other two, and it is rigidly fixed to the shaft, whilst the outer wheel is free to revolve upon the crank-shaft but is rigid with the brake-drum which is held to give the "reverse." Engaging with all these three spur-wheels are two sets of corresponding planet wheels which are free to revolve upon pins fixed, on opposite sides of the crank-shaft, to the shell forming the low-speed brake-drum. Each set of three planets have their wheels fixed to one another, so that when the low-speed brake-drum is held stationary, they resemble the "back-gear" of an ordinary lathe.

Normally the whole of this gear (which is seen in Fig. 7) is "locked"—so that it runs as one piece with the crank-shaft—by the disc-clutch which forms a part of it, and then the power is transmitted direct from the crank-shaft to the back axle. The clutch is formed by the disc, M^1, which rides upon a feather on the shaft, and can be forced up against the side of the "reverse" brake-drum when the cone, M, is caused to slide inwards along the shaft. The cone, M, engages with three toggle levers, M^2, and causes them to act in the well-known manner upon the sliding disc, whilst the clutch can be adjusted by screwing the bracket which carries the levers, M^2, either inwards or outwards, and locked when adjusted, by a set screw. The clutch is operated from the rock-shaft, M^4 (seen in Fig. 7), through the pivoted bell-crank, M^3, and this same shaft also controls the brake-band, N, which acts on the low-speed brake-drum, so that both these speeds are controlled through the connecting-rod, M^5, by the same hand-lever.

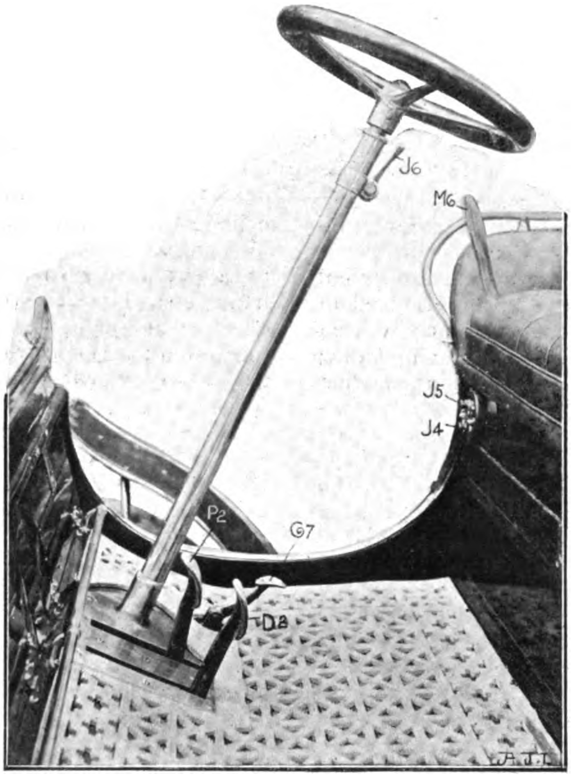


FIG. 8.—View showing the Regulating Levers and Pedals on the "Ford" Petrol Car.

The low-speed-gear is introduced by tightening the brake-drum, N, about its drum, and then the pins upon which the planet wheels revolve are held stationary, so that a double reduction gearing is introduced between the crank-shaft and the sprocket. Provision is made by the set-screw, N^2, on the tightening lever, N^1, for adjusting the brake-band, N; the actual tightening action is obtained by cams on the rock-shaft, M^4.

The "reverse" gear is not quite as satisfactory, from a mechanical point of view, as the low-speed-gear, although it is sufficiently so to suit its purpose; this is, to a great extent, shown by the fact that it is not so silent in action. When the brake-band, P, is tightened the spur-wheel attached to it is held stationary, and then the sprocket-wheel is driven in an opposite direction to the crank-shaft by virtue of the differences in diameter of the various planets and of the wheels with which they engage. The brake-band, P, is operated by a rod, P^1 (Fig. 3), which lies on the underside, and the adjustment-nut for the brake is also situated beneath the brake-drum; this gear is controlled by a foot-pedal.

The entire gear runs in oil, which can be introduced to it through a plug-hole fitted between the two brake drums. It contains sufficient oil for running a considerable distance without attention, but should be filled up occasionally to replenish what may have escaped. It will have been realised that it only contains nine spur-wheels in all, and it will be seen from our illustration that the case enclosing it is very compact. When the top-speed is in use, the gear ratio between the engine and the road-wheels is such that the car will travel at about 21 miles per hour when the engine is running at 800 revs. per min., though this speed can be considerably exceeded if the engine is accelerated. The low-speed-gear introduces a further reduction in the ratio of about 3 to 1, so that when it is employed the normal speed of the car is about 7 miles per hour.

The System of Control.

The control of a "Ford" car is very simple, the various levers and pedals for which are clearly shown in Fig. 8. To the right of the driver's seat is the change-speed lever, M^6, which lies in a central position when the car is at rest. To start the car—by introducing the low-speed-gear—this lever is pressed rearwardly, and, if moved as far as it will go, it will remain there. When starting, however, it is only necessary to press it back sufficiently to get under way, and it can then be moved forwards to bring the top-speed into play. When running normally it may be left in its forward position, or, when travelling in traffic, the clutch can be allowed to slip to a certain extent by exerting only the requisite pressure on the lever.

The foot-pedal, P^2, which lies just to the left of the steering-pillar, is that by which the "reverse" gear is introduced, and this, of course, is only used when the hand-lever, M^6, is in its neutral position.

To the left of this pedal is the brake-pedal, D^2, which actuates the internal expanding-brake, on the back axle.

The third, and smaller, pedal, G^7, is operated by the right foot, and it controls the throttle valve. The speed of the car on the road is therefore controlled for the most part by means of it, the speed increasing as it is depressed. When completely released, the engine can only obtain sufficient mixture to run quite slowly when the car is at rest.

The hand lever, J^6, on the steering pillar is that which regulates the time of ignition, and should, in consequence, be moved from the vertical position (in which it is in our illustration) downwardly, as the speed of the engine is allowed to increase. As shown, the ignition is "retarded" to the extent necessary for starting, and it assumes a horizontal position for full "advance." Relating also to the ignition system, is the two-way switch, J^4, which is fitted just below the seat. This switch allows either battery of cells to be brought into use, alternatively, or the current to be entirely cut off. The switch is also fitted with a detachable contact plug, J^5, which can be removed to prevent the car being started when the driver leaves it.

The body is constructed so that all the various parts of the mechanism can be readily got at when occasion demands. The front seat can be lifted up for replenishing, and the woodwork forming the front of it is hinged so that the coil can be exposed to view. The floor, too, both in the tonneau and in front of the driver, can be lifted out, so that there is no part of the mechanism to which access cannot be obtained quickly and conveniently. The front portion of the body forms a low dash, which is so constructed as to constitute a sufficiently large tool-box, in which even such comparatively large accessories as jacks and tyre pumps can be accommodated. The petrol tank holds about 4½ gallons, which is found to be sufficient for running a distance of about 135 miles. As we have already said, the 4-seated car is made in such a way that the tonneau is detachable; when this is removed, a sloping back is substituted.

A NEW FIELD FOR THE PETROL MOTOR.

The Royal Horticultural Society's Show, which has been held during last week at the Botanical Gardens, Regent's Park, was, perhaps, hardly the place at which one might expect to find the latest application of the petrol motor. Nevertheless, visitors had hardly entered those pretty grounds before they were greeted with the unmistakable sound of the internal combustion motor at work. There has been a good deal said lately about parks and pests

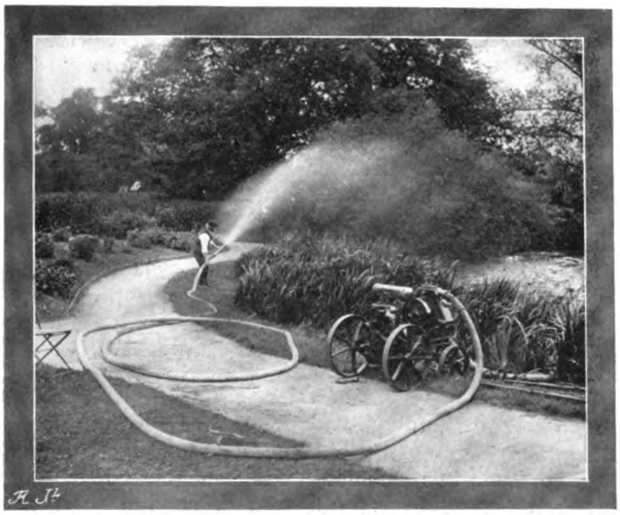


Fig. 1.—The Merryweather "general purposes" pump at work in the Grounds of the Botanical Gardens.

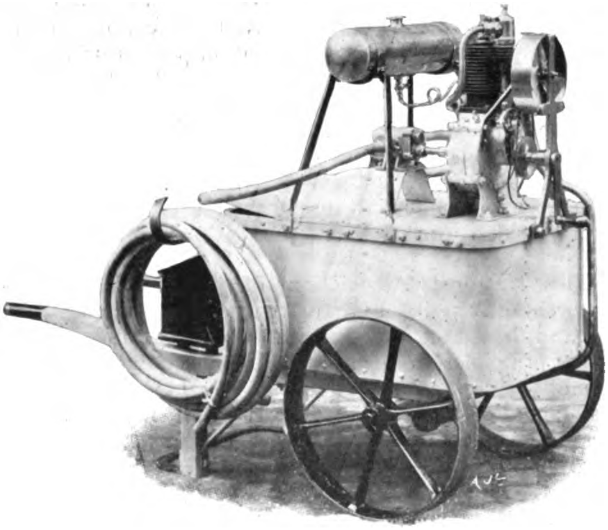


Fig. 2.—Portable Petrol Motor-Driven Hop Washing Plant, constructed by Messrs. Merryweather and Sons.

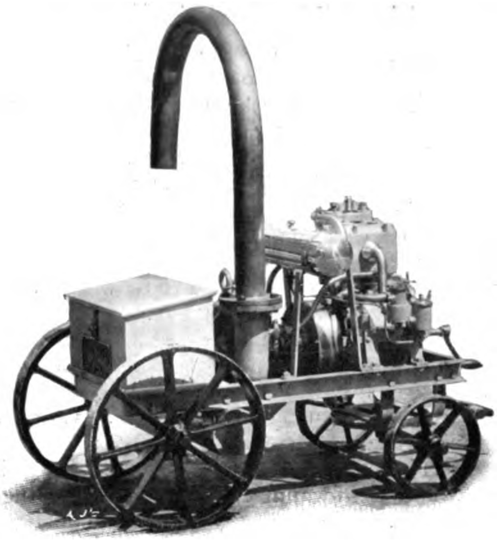


FIG. 3.—A compact Petrol Motor-Driven Centrifugal Pumping Plant, specially constructed by Messrs. Merryweather and Sons for irrigation purposes.

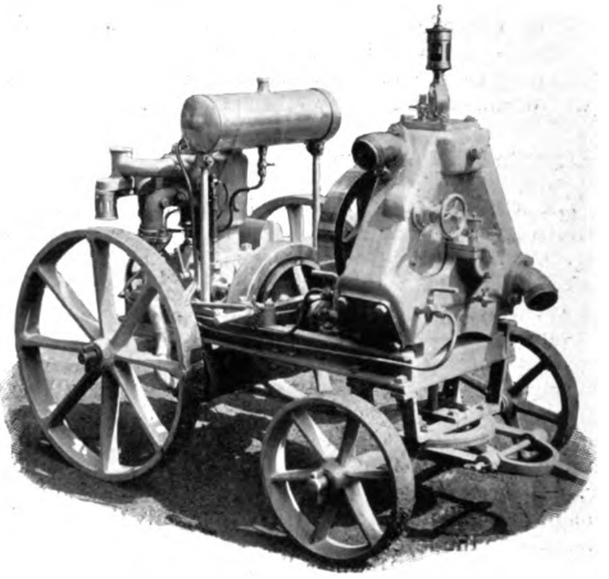


FIG. 4.—Three-Throw "Hatfield" Pump driven by 12-h.p. Petrol Motor, suitable for general purposes on an estate.

but it did not seem as if the various motors exhibited there were regarded in that light at all, although they could hardly be expected to harmonise with the magnificent show of flowers with which the gardens abounded.

The motor lawn mower is not new to our readers, and some fine machines were exhibited by Messrs. Ransom, Simms, and Jeffries. But it is to Messrs. Merryweather that the novelties in "horticultural motors" were due on this occasion, and for these they have been awarded a gold medal. We illustrate on this page some of the machines which were exhibited by this enterprising firm, and it will be noticed how particularly adaptable the petrol motor is to small portable machines of this kind.

Agriculture and horticulture are both industries which depend, one might say almost entirely, on the question of water; at any rate, in every branch of both these industries the question of adequate water supply is a vital one. There are many instances where the means of securing an adequate supply of water from a comparatively short distance would have the effect of neutralising a dry season. For such irrigation purposes Messrs. Merryweather have constructed a very handy little motor-driven centrifugal pumping plant, the whole being mounted on a light "chassis," running on iron wheels, so that it can be drawn to any desired part of an estate. The petrol engine has a pair of cylinders, and develops 12-h.p. It is coupled direct to a 4-inch centrifugal pump, which can deliver 300 gallons of water per minute against a head of 25 feet—a capacity eminently suited for the purposes of irrigation.

Its antithesis is found in the diminutive hop-washing plant, of which we also give an illustration. The tank capacity of this is 40 gallons, and in this tank the "wash" is mixed. On the top of the tank is fixed a 2-h.p. bicycle motor, which is air-cooled by a fan, and drives direct on to a very small rotary pump which can deliver 3 gallons per minute at 60 lbs. pressure per sq. in. Here again the design has been adapted to meet the requirements of a particular case. A very small volume of "wash" is required for hop-washing, but a high pressure is necessary in order to get that wash properly delivered—as a spray—through the exceedingly fine pulverising jets which must be used for this operation. So fine are these jets that they hardly take one gallon per minute, so that even such a diminutive plant as that illustrated could supply nearly four jets.

Another interesting "motor" exhibit was also shown by Messrs. Merryweather, this consisting of a very compact pumping plant for general use. The 8-h.p. motor, which has a single water-cooled cylinder, drives—through a single reduction gear—a three-throw "Hatfield" pump, capable of delivering 100 gallons per minute at 80 lbs. pressure. On a large estate, such a machine would have innumerable uses—it might even be used as a fire engine. The particular pump exhibited had been sold to the Household Cavalry Polo Club, for watering the ground.

THE National Association of Automobile Manufacturers of America have determined to seriously take in hand the question of local shows in the States. The broad principles in regard to this question which they intend to adopt are that henceforth local shows must be sanctioned and dates fixed by the N.A.A.M. Shows will only be sanctioned which are conducted by a local trade organisation or a local club, the former to have the preference, whilst every show must be an automobile show purely, no "mixed" shows being allowed. *Per contra*, the N.A.A.M. will bind its members not to exhibit at other than these sanctioned shows.

IN the new rules of the A.C.G.B.I. now under preparation, the Club Committee advocate that proxies are for the future not to be admissible, and that members must vote for the full number of candidates to fill the vacancies at each election of the committee.

A CANVAS "shoot" fire escape is now attached to the Piccadilly premises of the Automobile Club. Recently, at 7.30 a.m., this "shoot" was inaugurated by Mr. Frank Butler, who was the first to descend in a trial fire practice, Mr. MacIntosh, the steward of the club, and his staff of male and female servants following Mr. Butler in rapid succession.

THE "G.A." GOVERNOR FOR PETROL MOTORS.

A NOVEL device for controlling petrol motors is that put on the market by Messrs. Grouvelle and Arquembourg under the name of the "G.A." Governor, a diagrammatic illustration of which appears in Fig. 1. The apparatus is intended to obviate the necessity for using a governor of the centrifugal type by substituting a pneumatic control instead. This is done by making use of the suction in the main induction pipe to work a diaphragm which actuates a needle-valve situated in the petrol feed, between the float-chamber and the jet.

In Fig. 1, A represents the float-chamber, in which it will be noticed that the customary lever arrangement has been eliminated by inverting the cutting-off needle-valve, and also that the bottom plate of the float drum is enlarged in order to have a damping effect on sudden disturbances. In the pipe communicating between the float-chamber, A, and the jet, A^3, is a valve, A^1. Immediately over the valve, A^1, is a fitting containing a diaphragm, B (open on the under side to the atmosphere) which carries a spindle, B^1, the lower extremity of which presses on the valve, A^1. The valve, A^1, is under the direct control of the spring, A^2. The diaphragm, however, is under the control of a spring, B^2, which is stronger than the spring, A^2, but may be adjusted by the screw, B^3. The valve, A^1, is therefore normally held open by the spring, B^2. The upper half of the diaphragm-chamber is in communication, through the pipe B, with the induction pipe, C, and consequently any suction in the pipe, C, forms a vacuum in the top half of the diaphragm-chamber.

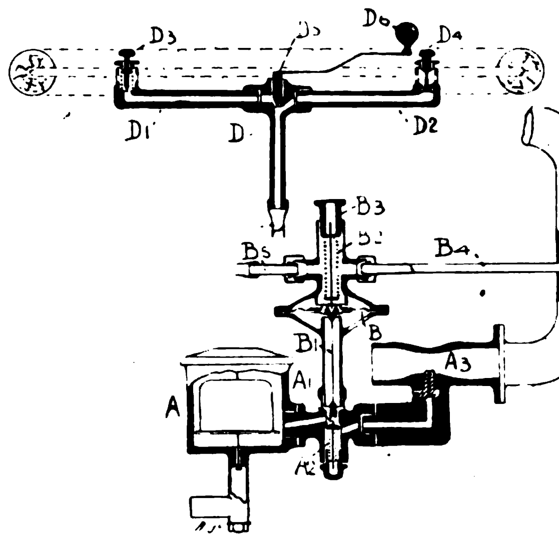


FIG. 1.

A pipe, B^6, also communicates with the top half of the diaphragm-chamber, while its other end terminates in a fitting, D, which is fixed to the steering-wheel, from which position the governing of the engine is regulated. The fitting, D, consists of a "T" socket-piece into which screws the two pipes, D^1 and D^2, terminating in spring-controlled valves, D^3 and D^4, at their other extremities. The valve, D^3, is normally held open while D^4 remains normally closed. In the head of the fitting, D, is a screw-down valve, D^5, operated by a handle, D^6; closing this valve entirely obstructs the communication between the pipes, B^5 and D^1, and consequently between the top half of the diaphragm-chamber and the atmosphere. The communication between the pipes, B^5 and D^2, is unaffected by the position of the valve, D^5.

To reduce the engine speed, the petrol supply to the jet must be reduced by partially closing the valve, A^1. This can only be accomplished by allowing the suction in the top half of the diaphragm-chamber to overcome the pressure of the spring, B^2, which is only possible by restricting the communication between the pipe, B^5, and the atmosphere. By closing the valve, D^5, this is done gradually, but should the exigencies of traffic require a more immediate effect, then the valve, D^3, is pressed down, which instantly shuts off all air supply to the upper half of the diaphragm-chamber, and facilitates the immediate formation of the requisite vacuum. Should, on the other hand, the valve, D^5, be closed—the engine running slowly—instantaneous acceleration can be obtained by depressing the valve, D^4, which puts the pipe, D^5, into communication with the atmosphere and immediately destroys the vacuum in the top half of the diaphragm-chamber.

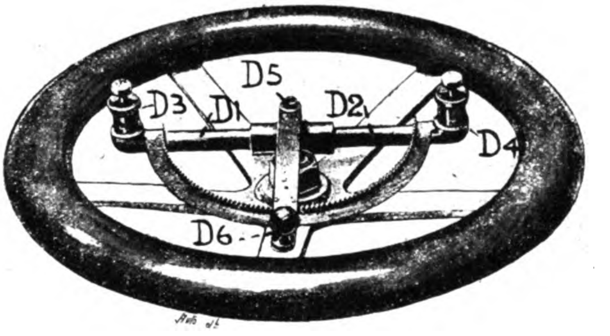


FIG. 2.

It is interesting to notice that this device gives, in some respects, the advantages of an automatic carburettor. Not only are increases of engine speed, through reduction of load, automatically accompanied by a diminution in the flow of petrol to the jet—corresponding to the opening of auxiliary air holes in other automatic carburettors—but, as the engine is allowed to run faster by the hand-control, so an additional amount of auxiliary air passes from the fitting on the steering-wheel to the induction pipe.

YOU cannot, in the opinion of the Highgate magistrates, register a motor bicycle as such and then proceed to metamorphose it by adding a couple of wheels and a seat without committing an offence under the Motor Car Act. We understand the defendant, Mr. Thomas Belvoir, who was fined £4 7*s.* for offending in this manner, is going to appeal, so we must not discuss the matter further.

AT the International Congress of Automobilists, which will be held in Berlin on the 20th inst., it is proposed to discuss a suggestion for the establishment of clubs of chauffeurs, to be in connection with the different automobile clubs, so that the members of such clubs, when requiring drivers, can forthwith apply to the associated chauffeur club.

AMERICAN NOTES.

(By A Correspondent.)

New York, June 4th.—Event by event, the season's work in America is being laid out for the devotees of automobiling as a pastime and a sport, and of autoboat racing as a sport, pure and simple. During the week just closed dates for some of the larger and more important events have been set, and within a week the season's events will be pretty well known. While no definite date has been announced as yet for the Vanderbilt Cup Race*, one is promised within a short time. The members of the Racing Board of the American Automobile Association have held sundry meetings with W. K. Vanderbilt, jun., the donor of the cup, and much has been decided upon. What this may be is not to be known for some time, as the Board desires to have every detail so arranged that there may be no question when the announcement is made. In New York the guessing is pretty lively as to whether the race is to be open to the world or is not, but upon good authority the writer learns that it is to be open to the world, and that all of the fast drivers of Europe and of any other land will be welcome here. To true sportsmen this news is welcome, although some men, who suppose themselves loyal to America, and who wish to see the American colours triumphant, howl for a closed race in order that no chances may be taken. Others believe in true sportsmanship, and believe that, providing the men of Europe can come to America and carry away the cup to their shores, they should be allowed to do so by all means, when American makers will be aroused and go after it, just as they are now aroused to action in regard to the cup team. The failure of the team this year has proved a very salutory lesson to American makers, and American pride is hurt vitally. Should Europe come and carry away the Vanderbilt Cup, then Americans' cup will be filled to the brim with woe, but Americans are not those to give up a fight, as has been long demonstrated.

In opening the door for the Vanderbilt Race the makers will be spurred on in this country to mighty endeavours in the racing line, and the best drivers of Europe will find on this side good drivers and good cars.

Already there are under construction a great many fast cars in American factories, and these cars are being designed and worked upon for the Vanderbilt Race. The makers are silent in regard to their efforts in this direction, but sundry rumours are being heard now of fast cars held in reserve, and drivers have been approached to handle such cars. Once the announcement of the date is made there will be some lively hustling, and when the time of the race comes round there will be in the field an army of American cars and American drivers.

Meantime many Americans are purchasing fast foreign cars, for every American is anxious to win the great race, even though it be on a foreign car. Orders have been given for a great many racers by private parties, and more will be ordered. There is money on this side, among the class which has taken up automobiling, to purchase the best cars in Europe at any price, and this money will be expended. It is dollars to doughnuts that the winning machine in the cup race is purchased by an American if that is possible.

The great 8 mile hill-climbing contest up the precipitous side of Mount Washington, N.H., will be held. An announcement of the date is expected now within a very short time, together with the announcement of the contests to be held. The course is ideal for such a race. It has also been decided to hold 1 and 2 mile races on the 3 mile stretch of ideal going at Orchard Beach, and the residents there will contribute handsome prizes, erect grand stands, and so on. The beach for 3 miles is 500 feet wide and uuobstructed. It has also been decided to hold a meet at Virginia Beach, Virginia, September 26th, and the course has been inspected again and again of late. Last spring, when a New York party thirty strong inspected it, the beach was soft from the seeping of the water to the beach from high ground, but as the water is now out of the hills the beach has hardened and is said to be in excellent shape for racing. In addition to these two beach race meets, there will be held at Ormond, in November, a great record-breaking carnival, when all sorts and kinds of cars will be given their try outs with official timing. Match races may be run, but no open contests will be held. This carnival will be a curtain-raiser for the great meet in January, dates for which have been allowed for late January and early February. So successful was the last tournament that the big Ormond Hotel is being greatly enlarged by the addition of 100 splendid rooms, and accommodations for one half the enlarged hotel have already been made.

The committee which has in charge the arrangements for the St. Louis tour is hard at work, and when, on July 26th, the thousands of automobiles start for St. Louis along the numerous main lines leading to the Exposition, an army will be found on the march. Chairman Augusts Post, the New York banker, is untiring in his efforts, and is now engaged in touring over every inch of the roadways on every route, gathering data for an exhaustive and most complete analysis of the routing in book form. Secretary Gullette is compiling all the data received from the President and the committees, and the run book will be very complete and exhaustive when completed. The chairman of committee after committee has so enlarged upon his original estimate, and the inquiries have increased so rapidly, that it is now certain that the original estimates will be doubled and even trebled before the summer is very far advanced as regards the attendance. The committee appointed by the Mayor of St. Louis to attend to the reception and entertainment of the visitors has extended a cordial invitation to the autoists to take part in the big parade of St. Louis Day, August 11th, when the President of the United States will review the paraders. It is estimated that at least 12 miles of automobiles, the machines 25 feet apart, will pass the reviewing stand. The committee having in charge the run has opened in New York an office where business is being transacted as in the counting-room of a large wholesale house, and the office force is being rapidly added to as the exigencies demand.

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* [Elsewhere we give the date and other details received by cable.—Ed.]

SPEED LIMIT APPLICATIONS.

Two further inquiries under the Motor Car Act have been held during the last few days at Beverley and Todmorden, the former having applied for a five-mile limit for three places within the borough, and a ten-mile limit on all other roads.

Earl Russell and Mr. Rees Jeffreys appeared in opposition to the application on behalf of the Automobile Club and the Motor Union of Great Britain and Ireland.

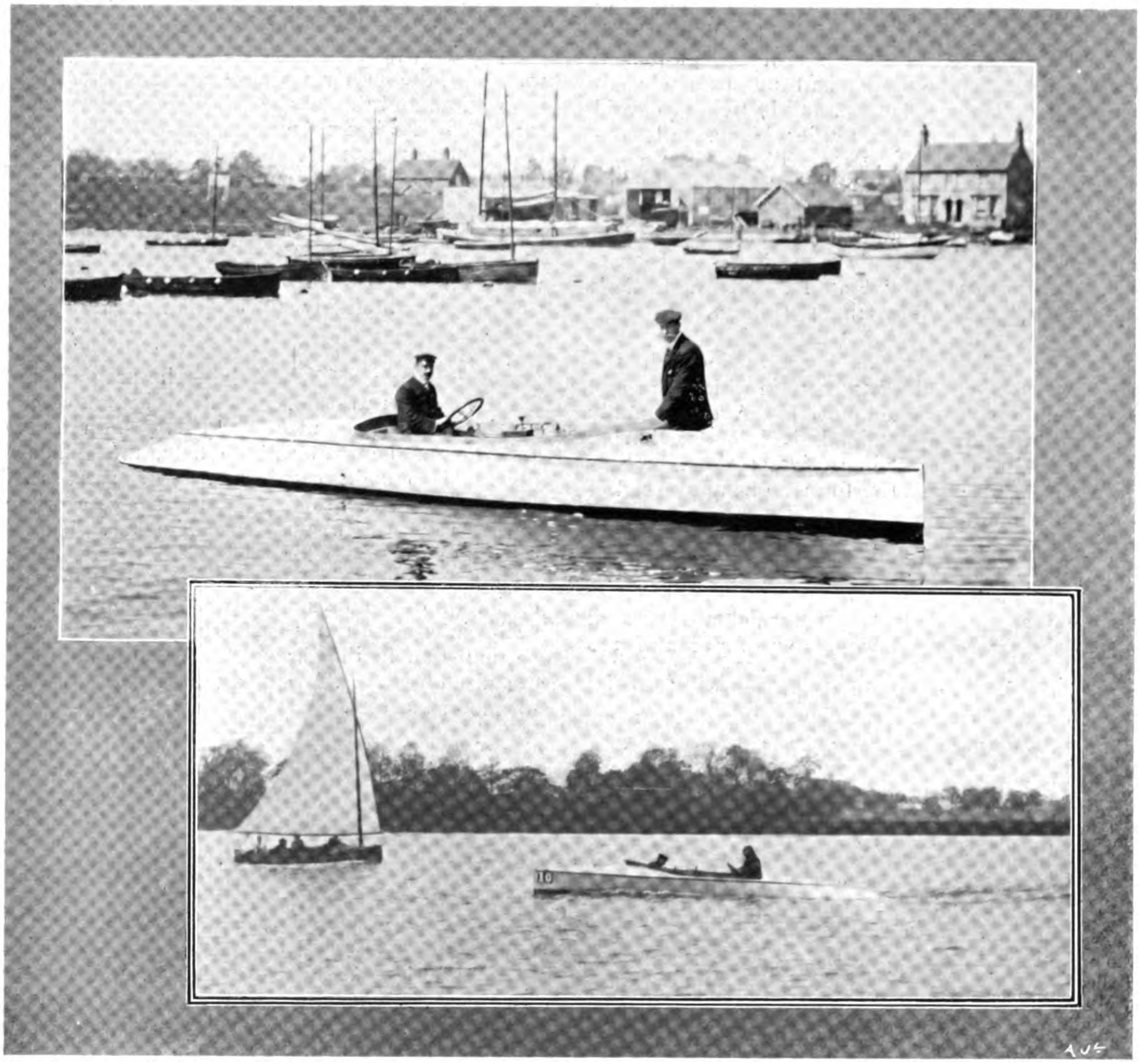
The Town Clerk called, in support of the application, the Borough Surveyor and the Chief Constable. Mr. Rees Jeffreys, on behalf of the Club and the Union, called as witnesses Earl Russell, Mr. E. Starkey Wade, of Kirk Ella Hall, Hull, and Mr. F. Lambert, of Beverley, who all gave evidence in opposition to the application.

The Inspector, after hearing the evidence and speeches from both sides, stated that he would report to the Board.

The second inquiry was held at Todmorden the following day. Todmorden applied for a ten-mile limit for all roads within the borough. The Town Clerk called in support of the application the Surveyor and several members of the Highways Committee. Mr. Rees Jeffreys pointed out that no police witnesses had been called, nor was any evidence forthcoming that the ordinary law and the provisions of Clause 1 of the Motor Car Act had been proved insufficient to deal with the motor traffic passing through the borough.

In opposition to the application he called Earl Russell on behalf of the Automobile Club and of the Motor Union; Dr. Crossley Bright on behalf of the Yorkshire A.C.; Dr. McRoberts and Mr. Petrie on behalf of the local automobilists; and Mr. Herbert Wright (hon. local correspondent of the Motor Union at Rochdale) and Mr. O'Neill on behalf of the Manchester Automobile Club. Mr. Smith Lawson appeared on behalf of the Burnley Automobile Club, and the Halifax A.C. was also represented.

MOTOR BOATING.



A considerable business is now being done by Messrs. J. W. Brooke and Co., Limited, of Lowestoft, in motor boats. Being near to the Broads, the firm are in a good position to cater for the requirements of the motor-boating community. We had occasion recently to illustrate a speedy little launch which they had built, and in our pictures above we show their latest production, the "Baby" Brooke. The lines of the little craft are particularly well designed, as will be seen from our top picture, in which the boat is lying stationary, whilst in the lower view the "Baby" is seen showing her paces at a speed of 11 knots per hour. She is capable of adding another knot to this under good conditions. She is only 25 feet long and fitted with one of the 3-cylinder 14-h.p. Brooke motors.

Motor Boat Races at Meulan.—The 100 kilometre race for motor boats between De Poissy and Meulan, on the Seine, was carried through last Sunday. Owing to various causes, considerable disappointment was experienced in the entries. "Trefle-a-Quatre," which earned such a reputation at Monaco, was unable to take part, and "Marsouin II.," which has recently come to the front, retired from the race after covering a few kilometres. The best time was made by "Titan II.," in the 8-metre class, the time for this boat being 2 hrs. 56 mins. 36 secs., the owner securing thereby the Marius Dubonnet Cup, held up to that date by "Flore." "Princess Elisabeth" was second in 3 hrs. 8 mins. 24⅗ secs. In the racers over 8 metres, "Musette's" time, the winner, was 4 hrs. 18 mins. The results for the cruisers were:—

1. Boats under 6½ metres (66 kiloms. distance), "La Marguerite," 3 hrs. 14 mins. 13 secs.

Boats 6½ to 8 metres, "Consul," 3 hrs. 14 mins. 22 secs.

Boats 8 to 12 metres (100 kiloms. distance), "Vas-Y," 5 hrs. 7 mins. 42 secs. (record for cruisers).

A SERIES of motor boat races were held on May 30th on Long Island Sound (U.S.A.). This was an inaugural meeting by the American Power Boat Association, which was working in co-operation with the Manhasset Bay

Yacht Club. About thirty craft had been entered, but of these there were only twelve starters at the line for the various events. These being divided between the seven different classes, reduced the races to something akin to a series of "sail-overs." Mr. Vanderbilt's "Hard-Boiled Egg," to which the visitors had looked forward for some high speeds, had unfortunately got mixed up with a Panhard launch, and in trying to avoid a serious collision, bent her rudder blade, and consequently retired from the contests. The fastest time of the day was made by the "Japansky," a 39 feet boat fitted with a 40-h.p. Speedway motor, and against her a protest was lodged by the owner of "Fiat II." This boat made a speed of 20·3 m.p.h. The only other real speed boats were C. H. Tangemann's "Fiat II," H. A. Lozier's "Shooting Star," and A. Massanet's Panhard.

FURTHER experiments have been made with the gliding boat by Count de Lambert, in which a 12-h.p. De Dion-Bouton motor is employed. A considerably increased speed has been obtained, the kilometre having been covered down stream in 1 min. 44⅖ secs., and up stream in 1 min. 51⅗ secs., the former giving a speed of 21·42 m.p.h.

AMONG the most recent entries for the Kiel Motor Boat Competition are two very powerful boats in Class I. (maximum 25 metres in length), which are declared to possess the enormous horse-power of 500 and 320 respectively. The former is built by the Howaldtswerke, of Kiel, and the latter by F. Schichau, of Elbing.

Motor Boat Reliability Trials of the A.C G.B.I.—The following entries have been received for these trials, taking place on July 26–27.

Competitor.	Length.	Builder of— Hull.	Engine.
		Class 1.	
Mr. Miall Green...	13 ft. 6 in.	Aldons ...	... Popular.
		Class 2.	
Vaal Motor Co....	18 ft.	... Vaal Co. ...	... Vaal Co.
Mr. H. Beadle ...	16 ft.	... Tolch ...	... M.M.C.
Crosby Motor and Eng. Co.	16 ft. 6 in.	Cole and Son	... Cushman.
Seal Motor Co. ...	18 ft.	... F. Maynard	... Seal Co.
		Class 3.	
Mr. G. P. Spooner	25 ft.	... Hart Harden	... Tangyes, Ltd.
Mr. E. C. Muir...	22 ft.	... Paul Jones	... Milnes Daimler.
Mitcham Motor Co.	20 ft. 3 in.	Clare Lallow	... Fay and Bowen.
Vosper and Co. ...	22 ft. 5 in.	Camper & Nicholson	Vosper.
Thornycroft, Ltd.	—	—	—
		Class 4.	
Maudslay Motor Co.	25 ft. 6 in.	Sergeant and Co.	Maudslay Co.
Mr. Frank Beadle	29 ft. 7½ in.	Saunders...	... M.M.C.
Gobron Motor Co.	30 ft.	... Hansen ...	... Gobron-Brillie.
Thornycroft, Ltd.	—	—	—
		Class 5.	
S. F. Edge, Ltd..	35 ft.	... Saunders...	... Napier and Son.
Mr. J. Gorham ...	40 ft.	.. Canstadt-Daimler	Daimler Co.

AUTOMOBILISM is progressing steadily in Australia. Last month Mr. R. A. Duncan, secretary of the South Australian Automobile Club, completed a motor car journey of over 600 miles between Adelaide and Melbourne in the time of 38 hours. Beyond tyre punctures Mr. Duncan had no mishap with the exception of a slight difference with a tree one dark night.

RACES, RECORDS, AND TRIALS.

Circuit des Ardennes.—Last year it was proposed by the A.C. of Belgium to vary and increase the route of the Circuit des Ardennes by about 25 kiloms., but time was short, the authorities were not inclined to favour the innovation, and the matter was therefore dropped, after careful surveys had been made on behalf of the Belgian Club. The matter has now been revived, and in all probability, when the circuit this year is run on July 25th and 26th, it will be found that arrangements have been made to add to the original circuit of 85½ kiloms. a further 34½ kiloms., making a total distance over the new circuit altogether of 120 kiloms., which it will be possible to traverse without any stops or neutralisation.

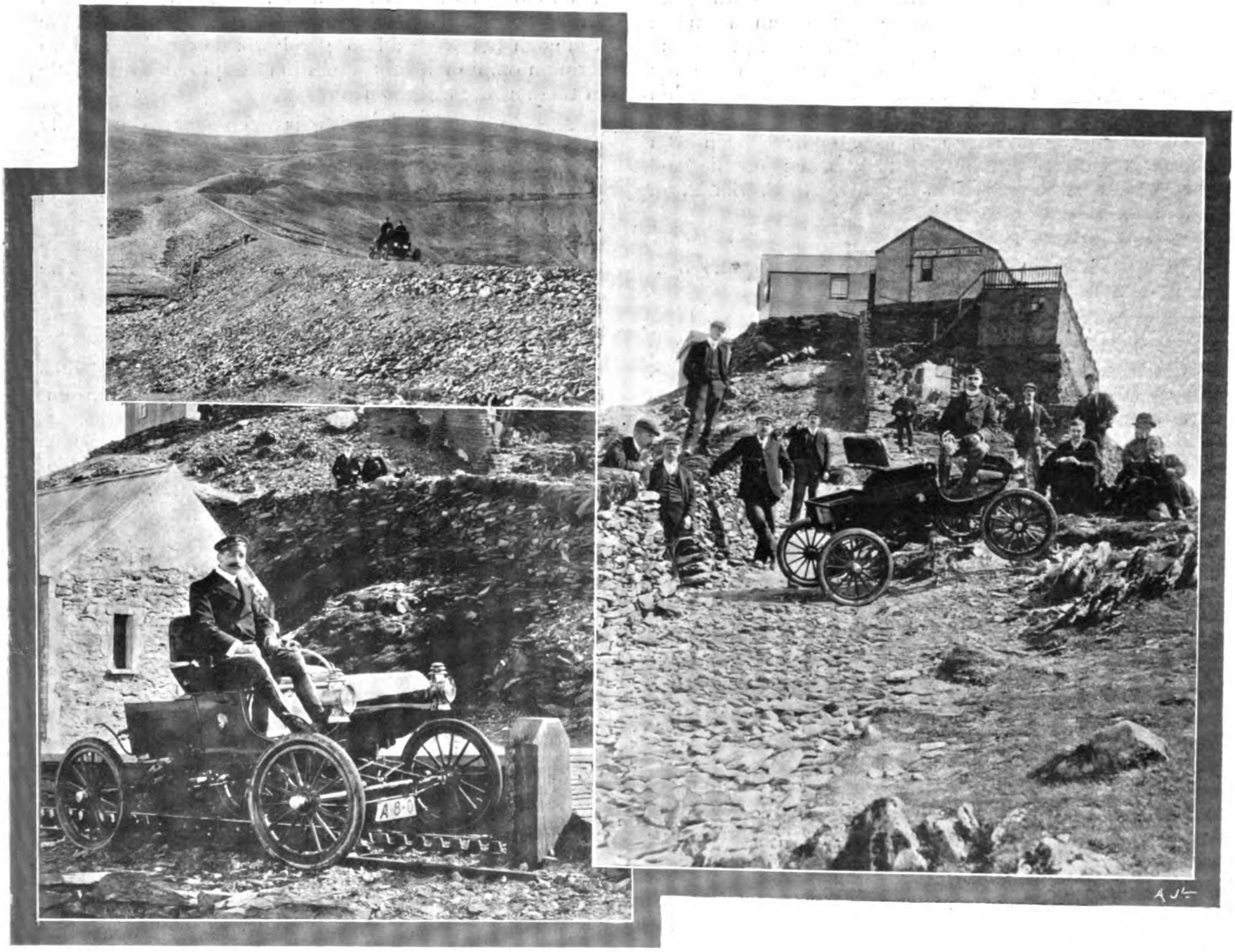
Ostend Automobile Week.—The programme for this fixture, July 14th-21st, is tentatively announced. On the first day a speed race over 5 kiloms. on the Nieuport and Snaeskerke road will be held, the vehicles being divided into eight categories:—July 15th, 10 kilom. speed race on the same road in five categories; 16th, tourist run Ostend-Blankenberghe and back; 18th, standing speed mile for racers and tourist cars; 20th, kilom. speed trials for racers and tourists; 21st, exhibition of the cars and Concours Fleuri; 23rd and 24th, inter-club run to Namur and Bastogne; 25th, participation in the Circuit des Ardennes and hill climb organised by the A.C. of Spa; 26th, long distance run for motor bicycles.

St. Etienne Hill-Climb.—Organised by the A.C. Forezien, this hill-climb was contested last week, the race being held over 8 kilometres on the Digonière à la Republique road. The best times were made by (1) Verpilleux (24-h.p. Rochet-Schneider), 7 mins. 40 secs.; (2) Collomb (30–40-h.p. Mors), 8 mins. 25 secs; (3) Luc Cort (16-h.p. Luc Cort), 9 mins. 40 secs. In all 15 competitors participated. During the day Collomb, on his Mors, was timed for 37 secs. over the kilometre on the flat, although the road was heavy and the rain severe. In the motor bicycle section, Perrin (6-h.p. Giraudon), was first, in 11 mins. 50 secs.; Delorme (2½-h.p. Bruneau) second, in 12 mins. 35 secs.; Digonnet (4½-h.p. Iris), third, in 14 mins. 40 secs. The best time in this section, 11 mins. 23 secs., was made by Maraudon, on a 4½-h.p. Griffon, but he was disqualified for starting twice.

As a result of the competition for the Rochet-Schneider Cup, full particulars and results of which we gave last week, this inter-club challenge cup now passes into the hands of Switzerland.

MONT CENIS Hill Climb, it is now announced, has been officially authorised for this year, and will take place on July 10th next. Last year permission was refused just before the event in consequence of the panic which followed the Paris-Madrid disaster. The course is a continual rise over about 23 kiloms., varying from 1 in 13 to 1 in 10. There will be classes for racers, tourist vehicles, and motor bicycles, and in addition to a number of minor prizes, three challenge cups will be competed for, including the Coupe Prince Amédée offered by Princess Lætitia Napoleon Buonaparte.

THE SECOND ASCENT OF SNOWDON.



Photos by Rowlands, Llandudno.

Mr. W. M. Letts' feat on Monday, June 6th, of climbing Snowdon on one of the standard Oldsmobile Cars is well illustrated in the three pictures which we reproduce above. We gave a few points in regard to this climb last week, and in this issue we publish some further details in regard to this remarkable achievement. The top photograph shows the car half-way up, and gives an idea of the grand sweep of the mountain. The photograph underneath shows Mr. Letts at the extreme end of the railway line at the top, whilst in the picture to the right a slightly higher point on the very summit above the railway line has been reached.

No one can take from Mr. Harvey du Cros the honour of having been the first to scale Snowdon on a motor car, but if he is a good first, Mr. Letts has proved a very good second, and, as mentioned in our last number, he successfully drove a 5-h.p. Oldsmobile up the railway to the top of the mountain, on Monday the 6th instant—by a slip last week we said Sunday. The Oldsmobile is, of course, just the car for work of this kind, as it is exceedingly light and manageable, and deducting a couple of stops of about ten minutes' duration, made in one place to take in water and in another to be photographed, the total time occupied in the climb from the bottom of the railway to the summit was only 57 minutes, which, considering the nature of the route and the fact that the car had to run all the way on ballast and sleepers, is a very remarkable performance. In fact, in Mr. Letts' own picturesque language, the Oldsmobile simply "romped" up to the summit. Permission had been obtained from the Snowdon Mountain Railway to use the line for the experiment and a special train was chartered to follow the car. The rack in the middle of the line was the cause of considerable inconvenience, as the rails had to be unevenly straddled to prevent the differential from coming into contact with it, as may be clearly seen in one of the photographs which we reproduce above. This brought the wheels, on one side, dangerously near to the edge of the ballast, and was very nearly the cause of a serious accident, as, when approaching the summit, the differential came in contact with the rack and deflected the outer wheels of the car to within a few inches of a precipitous descent of about 1,000 feet. Mr. Letts, however, with great coolness, though with considerable effort, brought the car back into safety again, and all ended well. The weather throughout the climb was most satisfactory, and little trouble was experienced in getting over the points, as three men were sufficient to lift the vehicle over the first two, while the last group of points was negotiated without any lifting at all, the car simply being driven over them with the same verve as Mr. Letts employed in climbing up the big stone staircase at the Crystal Palace. Had it not been for the culverts which had to be boarded over, the time occupied in the climb would probably have been even shorter than it was. Mr. Letts was accompanied on this venturesome excursion by Mr. A. C. Slater, of Llandudno.

JANUARY 14 to 26, 1905, has been fixed for the next Brussels Salon.

SEMMERING Hill Climb, organised annually by the A.C. of Austria, will take place this year on August 18th, the cars being run in four categories. The course is over a distance of 10 kiloms.

THE date for the Van Trials next year has again been changed, viz., to April 1st, owing to March 1st, the date previously selected, clashing with the Agricultural Hall Exhibition.

GORDON-BENNETT ITEMS.

The Kurhaus at Homburg will be the headquarters of the A.C.G.B.I. during the Gordon-Bennett week, the Oberbürgermeister of Homburg, Dr. J. Von Marx, having placed a room at the club's disposal. All members should at once register their arrival in the city.

A report is to hand that Mr. Edge's car, which has arrived at Homburg, has suffered from an accident to the crank-shaft. With commendable promptitude Mr. Edge at once ordered his more powerful spare 6-cylinder car, a description and illustrations of which appear elsewhere in this issue of the Journal, to be sent out to Homburg to be ready to replace the vehicle which has had the mishap. Should the repairs to the latter fail to be executed in time for the Race, we trust the Races Committee of the A.C.G.B.I. will exercise their prerogative and permit him to drive his spare car, so that England may be represented by the best possible drivers.

At the Piccadilly Club House arrangements were made to watch the progress of the Race on a screen in the smoking room, under the direction of Mr. R. E. Phillips, special race cards being provided by means of which the Race could be easily followed. To carry out this arrangement special telegrams were sent direct from the course reporting the progress of the Race. All news so received by the Club was placed at the service of the Press generally, editors being invited to send representatives to the club, a special room being reserved for them.

The German Automobile Club organised a tour round the course for tourist cars for the day following the race, starting from the Saalburg and finishing at Homburg. Limburg was selected for lunch at one o'clock, a re-start from there being made at 2.30 for the second half of the "circuit."

On the day before the Gordon-Bennett Race the authorities arranged for a dress rehearsal on the part of those who were appointed to guard and manage the course. All the policemen and other course-keepers had to be in their places and an imaginary race was arranged, so as to enable the officials to see that the arrangements were all in good working order and to form an opinion if any alterations required to be made in them at the last moment.

The Homburg authorities have co-operated cordially with the Race Committee to make the occasion successful. The management of the Kurhaus and Gardens arranged for evening performances at the Opera on Wednesday, Thursday, and Friday of this week, while to-night (Saturday) and Sunday concerts and illuminations will be carried out on an extensive scale. The Elegance Competition, to which we have already referred, will take place to-morrow (Sunday), and the day will finish up with a ball at the Kurhaus.

The German Automobile Club last week decided to face the very great expense of providing sufficient Westrumite to treat the *whole* of the Gordon-Bennett course. On this account they requested all car owners having occasion to cross or run along short portions of it, either before or on the day of the race, to travel as slowly as possible, in order to save the Westrumited surface.

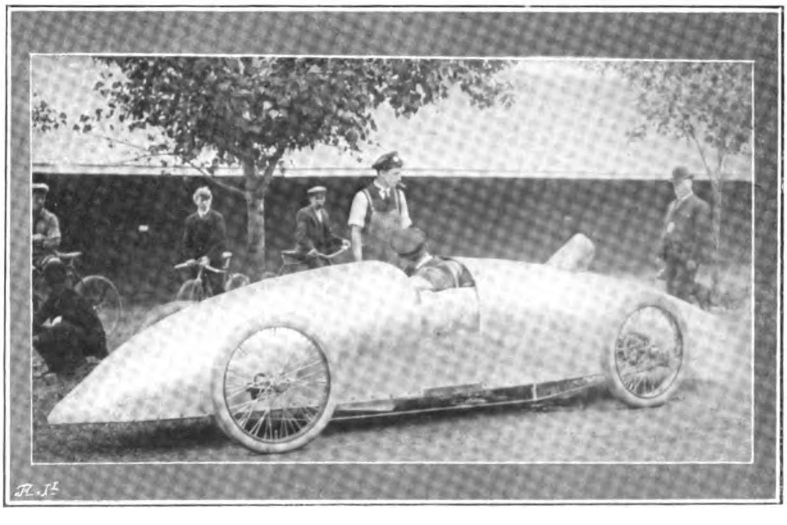
IT will doubtless be remembered by all those who followed the Isle of Man Eliminating Trials how well the set of Palmer Cord *touring* tyres fitted to Mr. Earp's car survived their first racing ordeal. Such a performance was not to be lightly passed over, and we are not surprised to learn that this company had the option of fitting their tyres to three out of the five cars which represent England in Germany. It is unfortunate, however, that the sizes required differ from those which are stocked by the company, and that as new plant could not be completed in time, they were reluctantly compelled to refuse the offer. It would have been distinctly interesting to have been able to watch the result of such a test, for, despite the already-proved excellence of some other makes, the inclusion of another tyre in the same category could not but be welcomed as a valuable acquisition to the motoring industry.

Vanderbilt Cup.—As we anticipated last week, the A.C. of America has decided that this cup shall be international, and open to every type of vehicle. The broad principles governing the competition for the cup are that each nation entering will be allowed a maximum of 10 vehicles. The distance of the course is to be not less than 250 and not more than 300 miles. The first competition for this cup is to take place on October 8, entries closing on September 8. The race both this year and next will take place in America. In subsequent years the course will be selected by the holder of the cup, and the race must be held between August 15 and October 15, entries closing each year on March 15. The entrance fee will be £60 per car, of which a proportion will be returned to starters. Entries, other than American, must be addressed to the A.C. of France, which club is to have charge of the organization of the race when taking place in any country other than America. In the United States the race will be run under American rules, in all other countries under A.C. de France rules. Cars are to be dispatched at intervals of one minute.

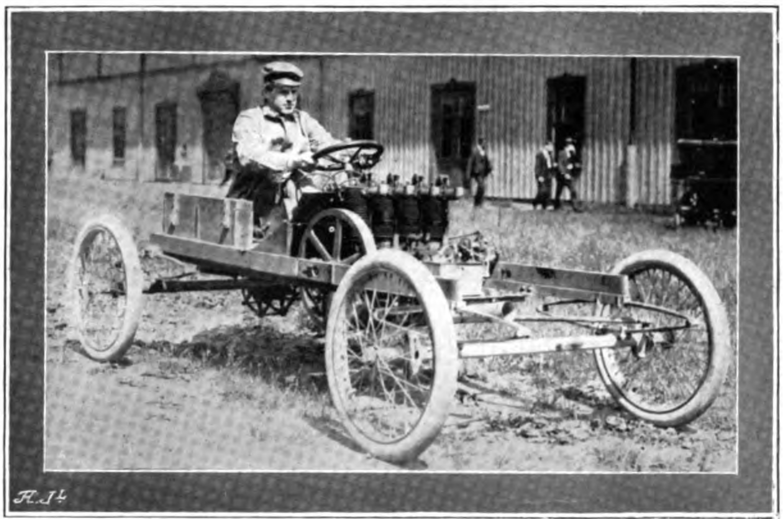
BOSTON (U.S.A.) RACE MEET.—A general view of the Readville Track on May 30th, when over 12,000 people were present to witness the Races, which had ultimately to be postponed owing to the heavy downpour of rain.

Boston Track Race Meeting.—On Decoration Day, at the Readville Track, near Boston, U.S.A., a very attractive programme had been got together by the Massachusetts Automobile Club, and fully 12,000 people were drawn to the meeting, in consequence the gate receipts totalling up, it is said, to over £3,500. Every seat and admission ticket was sold, and the management ultimately stopped the entrance of further persons to the track. There was some indication of rain to come even before the start of the first race at 2 o'clock, which was a 5-mile touring car race. This was followed by a 10-mile open race, which was got through without any mishap. Following this, when Barney Oldfield, with a Winton Bullet No. 2, and Otto Nestman, with a Stevens-Duryea "Spider," and J. W. Hillyard, with his Decauville car, came forward, the rain began to come down in earnest and completely swamped the track in a very short time. Racing became obviously impossible and after a meeting amongst the officials and a run round the course on the Bullet by Chairman Wallace, it was announced that the committee were compelled to postpone the races until the following Saturday afternoon, when it was determined to make the admission free and re-run the whole of the race programme in full, if possible.

Philadelphia (U.S.A.) Motor Race Meeting.—A poor attendance of the public was recorded at this meeting, held under the auspices of the Philadelphia Club at Point Breeze Track on May 30th. From whatever reason, the cars had, in nearly all cases, been badly classified. In the first instance the entries for the various classes were governed only by weight. About five days before the race meeting, however, the club issued circulars announcing a change to classification by horse power, it not being mentioned whether this was in addition to the weight classification. The consequence was that, for every race, protests rained down upon the judges. Most of the events resolved themselves into practically a walk-over, owing to the disparity of the power of the various cars running against each other.



BOSTON (U.S.A.) RACE MEET.—The Stanley Steamer seen in our photograph, and which is fitted with two large steam engines, took part in this meeting. Louis Ross, the driver, is just taking on water for his next race.



THE PHILADELPHIA (U.S.A.) AUTOMOBILE MEET AT POINT BREEZE.—The 10-h.p. Franklin Skeleton Car which won several events at the Philadelphia Meeting. This vehicle, which weighs 700 lbs., was designed by John Wilkinson, who is seated at the wheel of the car.

The state of the track, which was soft and in bad condition, besides the evidence of a quantity of glass and nails being present, did not help to make the meeting a success. To make matters worse, when the 15-mile race, the special event of the day, was "called on," Oldfield, on the Bullet, was disabled in the second mile, leaving Nathaniel Huggins, with his Decauville, to finish alone. With sportsmanlike action Huggins, however, declined this, and notified that he was quite willing that the race should be "called off" rather than that he should have a walk-over. Some good times were made by the 10-h.p. Franklin car, which carried off three first prizes and one second. This was the same car that made a standing mile in 1 min. 10 sec. at the Empire City track last year, and its peculiar construction is well shown in our photograph.

SMALL CAR TRIALS, 1904.

The Rules for these trials, organised by the A.C.G.B.I., are now to hand. These state that:—

The trials shall consist of 12 non-stop runs of approximately 50 miles each, starting from and finishing at the same point. A 50 mile non-stop run shall be made in the morning, and a similar run shall be made in the afternoon, for six days, a total distance of about 600 miles, and every car, in order to be eligible for any award, must complete the whole of the 600 miles.

The trials shall be confined to cars costing not more than £200.

There shall be four classes:—

Class A.—Not exceeding £125. Entrance fee £10.
Class B.—Exceeding £125, but not exceeding £150. Fee £12.
Class C.—Exceeding £150, but not exceeding £175. Fee £14.
Class D.—Exceeding £175, but not exceeding £200. Fee £16.

No fore-carriage, tricycle, or quadricycle shall compete.

Entries will only be accepted from manufacturers or their nominees. No manufacturer shall enter directly or indirectly more than two cars, which, unless there is more than 20 per cent. difference in volume swept by the piston, shall then be run as a team; that is to say, each car shall be awarded marks equal to the average marks gained by the two cars.

Entries close, at single fees, July 23rd. Up to August 13th, the latest date, fees increase at the rate of 25 per cent. per week.

Every entry shall be accompanied by a written guarantee by the manufacturer of the car to accept all orders from all persons for exact duplicates of the vehicle entered for trial, which may be given on or before December 14th, 1904, and to deliver all such vehicles so ordered, complete and in perfect working order, on or before June 1st, 1905, provided a cash deposit, not exceeding one-third of the price of the vehicle, is paid at the time of giving the order.

Should the manufacturer fail to comply with such guarantee, he may, at the discretion of the committee of the club, be disqualified from taking part in any trial or event organised by the club for a period not exceeding one year from the date when the committee shall decide to so disqualify him.

All vehicles taking part in the trials must be fully painted and have their full, not temporary, upholstery.

Any stoppage of the road wheels whatever, except for traffic or legal requirements, shall be considered as the end of a non-stop run; but, provided the engine is kept running, the car may be stopped with the consent of the Observer.

If possible, there will be a timed hill climb every day.

A car carrying more than two passengers throughout the whole of the trials shall be credited with an increase in speed over that actually shown on the hills amounting to 12½ per cent. for each such additional passenger carried.

The changing of sprockets at any time during the trials shall not be permitted, except in the case of a breakage, when the new sprocket fitted must be of the same size as the broken one.

Any car which drops a passenger shall be considered not to have made a non-stop run for that run.

The fuel consumption will be taken on one or more days.

Sufficient time will be allowed for replenishing petrol and oil tanks, &c., at the beginning of each run. Notes will, however, be made by the Observers. Any vehicle which refills tanks or replenishes lubricators when under way will be considered as not having made a non-stop run.

At the end of the first run on any day nothing shall be done to the car except turning off the fuel and lubricating taps and switching off, until the order to commence repairs and adjustments for the second run is given by the Observer. At the conclusion of the second run on every day nothing whatever may be done except the washing of the car, and turning off the fuel and lubricating taps, and switching off.

Washing must be done only in the presence of the Observer of the car, a maximum period being allowed every evening, to vary according to the condition of the roads.

Awards.

The committee will give awards on the recommendation received from the Judges appointed by the club, as follows:—

(*a*) The first award in respect of non-stop runs in each class shall be given to the car which makes the greatest number of non-stop runs. If there be more than one car or team in a class making the same number of non-stop runs, the award shall be given to the car or team which is credited with the highest average speed on the hills in the trials.

(*b*) A car which occupies more than 20 minutes before any run in repairs, replacements or adjustments is precluded from receiving any award in the non-stop competition.

(*c*) A car which is stopped for more than 20 minutes for repairs, replacements, or adjustments on the road during any one run is precluded from receiving any award in the non-stop competition, except in case of repairs wholly connected with tyre trouble, which shall cause that car to forfeit its non-stop for that run, but shall not disqualify it for the non-stop award.

(*d*) Cars not ready to start by 11 o'clock in the morning for the first run of the day or by 3 o'clock in the afternoon for the second run of the day, and cars not completing the 100 miles by ten minutes past 7 o'clock in the evening of every day for Classes B, C, and D, or by 8 o'clock for Class A, will be disqualified from all awards, and must take no further part in the trials.

The awards for the non-stop trials shall consist of certificates.

There shall be further awards, to be given at the discretion of the judges, which shall consist of Gold, Silver, or Bronze Medals, accompanied by a certificate stating the ground upon which the award is made and the Class in which the car is entered.

Note.—Although a car may be disqualified from obtaining a non-stop award for the reasons set out above, it may, if it has completed the whole of the distance of the trials, be eligible for the awards placed at the disposal of the judges.

The judges, in making their awards, will assume all cars to be new on entering for the trials, and no allowance can be made for any wear which may have taken place previous to the trials.

The judges shall have power to disqualify at any time any cars which, in their opinion, may be short of brake power or have faulty steering gear.

OBSERVERS.

Every vehicle will carry an official Observer, for whom a front seat must be provided.

The club will, as far as possible, obtain independent Hon. Observers, but the manufacturers must be prepared to furnish one Observer in respect of each car entered by them.

The name of each Observer must be submitted by the manufacturers to the committee on or before Saturday, August 6th. Competitors failing to comply with this shall not be permitted to take part in the trials. The Observer shall not act as Observer on the car of the competitor by whom he is furnished.

An Observer will, as far as practicable, ride on a different vehicle each day. He must not in any way assist drivers of cars; for instance, he must not turn on lubricators or perform any function, however small, in connection with the car. He must not assist drivers by suggestions. He must in all cases act impartially as the representative of the club. The only exception to this rule is that, in the case of cars carrying only two persons, the Observer may, if he thinks fit, and is requested to do so by the driver, assist in repairing tyres.

Observers must fill in a form giving particulars of experience, &c.

PASSENGERS.

All cars shall carry their full complement of passengers, or equivalent weight, and no extra passengers shall be carried beyond those for whom proper seats are provided. Passengers shall not be allowed to ride on the floor or step, or leave their seats when the car is under way.

DRIVERS.

A vehicle shall be driven by the same person throughout a day's run, unless he be incapacitated, when his place may be taken by a substitute.

SPEED REGULATIONS.

No speed above the legal limit is allowed. Any car which is shown to have made an average of more than 18 miles an hour on any 50-mile run shall be disqualified, and no car which makes an average speed of less than 12 miles an hour on any one run shall receive an award, except in Class A, where an average speed of 10 miles an hour will be admitted.

ARRIVAL AND STARTING.

All competing vehicles shall be within the gates of a place to be hereafter named by 12 o'clock noon on Saturday, August 27th. Any car arriving at the gates after that hour shall only be allowed to take part in the trials on payment of a fine of £10 up to 5 o'clock on the evening of that day; and no car arriving at the gates after that hour will be allowed to take part in the trials under any consideration whatever.

The first run shall start at 8 o'clock on the morning of Monday, August 29th, 1904, and the last run shall be on Saturday, Sept. 3rd. Vehicles will be started at 20 seconds interval in order of numbers, which will be secured by drawing lots for each day.

SPARE TYRES.

The carrying, during a trial run, of spare outer covers of pneumatic tyres, so attached to a motor vehicle as to be within sight of the public, is prohibited.

The rules conclude with the usual provisions as to non-passing on the road, control speeds in towns, disqualification, protests, &c.

CLUB DOINGS.

INTER-CLUB MEET AT THE EMPIRE HOTEL, BUXTON.—View of the Cars assembled at the Hotel.

Buxton Inter-club Meet.—It was quite certain after the success of the first inter-club meet at Buxton last September that the event would be an annual one, and judging by the enthusiasm on Saturday last, it will become, if not so already, one of the largest and best motor meets held in the country, for quite a hundred fully loaded cars were driven over, and a very representative event resulted. The same clubs as last year, the Manchester, N.E. Lancashire, Sheffield, Yorkshire, Nottinghamshire, and Lincolnshire took part, and each club was well represented. To get together these hundred cars at a meet is a creditable achievement of the Manchester club, which has taken the initiative, and which, guided by the hon. sec., Mr. J. Hoyle Smith, has carried out the arrangements admirably. The cars drew up on arrival in the courtyard of the Empire Hotel, which was again the rendezvous, and the place was soon full.

During the interval before dinner was announced some of the best cars were closely inspected, especially those belonging to Mr. Higgingbotham (Macclesfield) and Miss Daisy Hampson (Southport).

At the dinner which was held in the evening, Mr. F. Smith, President of the Manchester Club, presided over a gathering of quite 200. After the loyal toast had been given from the chair and heartily received, "Automobilism" was given from the chair in a racy speech which gave interesting reminiscences of the very early days, and placed in contrast the happier conditions prevalent now. The speaker emphasised the urgent need for something to be done in respect to the dust problem, which, he thought, and not the speed, was the cause of all the antipathy.

Mr. Rees Jeffreys, of the A.C.G.B.I., who drove over in Mr. Ingram's car, responded. Captain J. A. Cole, J.P., responded for the Lincolnshire Club, Mr. F. B. Cawood for the Sheffield Club, Mr. E. H. Hebber for the Yorkshire Club, and Mr. G. H. Kirk for the Notts Club.

After dinner a few of those present went for a run in the moonlight, while others stayed for the concert in the hotel. On Sunday rides to the many beauty spots in the neighbourhood, and, of course, a run to the "Cat and Fiddle," were indulged in, a few staying over till Monday.

Among the great number present at the meet we were able to pick out Mr. and Mrs. Harvey Foster, Sheffield, 10-h.p. Wolseley; Mr. and Mrs. Cronshaw and Mr. Hawkins, 15-h.p. Panhard; Mr. and Mrs. W. B. Jevons, Market Rasen, 9-h.p. De Dion; Mr. and Mrs. C. Cordingley and Miss Pursehouse, 60-h.p. Mercedes; Mr. J. Hoyle-Smith, hon. sec. Manchester Club, and Mr., Mrs. and Miss King, Manchester, 15–20-h.p. Belsize; Mr. and Mrs. Peter Eadie, Didsbury, 12–16-h.p. Clement; Mr. and Mrs. Armitage, Leeds, 11-h.p. Clement; Mr. Wilkinson, Manchester, 6½-h.p. Stanley steam; Mr. and Mrs. Davison and Mr. Kay and party, Eaton, 14-h.p. Darracq; Mr. and Mrs. J. W. Taylor, Manchester, and Miss Barker, 12-h.p. Darracq; Mr. J. Higginson, Cheadle Hulme, and Mr. A. W. Walton, Ashton-on-Mersey, and Mr. Avondale, 6-h.p. Vinot; Mr. and Mrs. J. Smith, jun., Bradford, 7-h.p. M.M.C.; Mr. and Mrs. Parkyn and Mr. Whitehead, Gee Cross, 7-h.p. M.M.C.; Mr. Gould, Mr. C. King, and Mr. Charles, London, 12-h.p. Gladiator; Mr. and Mrs. J. A. Morris, Altrincham, 16-h.p. Lanchester; Mr. J. C. and Miss Evens, Sheffield, and Mr. Rickard, Altrincham, 12-h.p. Darracq; Mr. Ellis, Sheffield, 8-h.p. M.M.C.; Mr. J. Hinde, Mr. Robinson, Mr. Sylvester, and Mr. W. B. Cawood, hon. secretary Sheffield Club, 12-h.p. La Plata; Mr. A. A. Padley, Market Rasen, 6-h.p. De Dion; Mr. Schwabe and Mr. Schwabe, sen., Baby Peugeot; Mr. L. Schwabe and Mr. J. Ash, and Mr. Lee, Manchester, 10-h.p. Panhard; Mr. A. E. Jones, Mr. and Mrs. Kenyon, and Mr. H. Jones, Manchester, 12-h.p. Clement; Mr. Rowcliffe and Mr. B. S. Harbourne, Manchester, 9-h.p. Clement; Mr. and Mrs. Crossland Taylor, Hilsbury, and Mr. M. Bonnallie, Chester, 10-h.p. Wolseley; Mr. Higgingbotham, Macclesfield, Dr. Fernando Guerra, St. Santander, Mr. Crewe and Mr. Kershaw, 60-h.p, Mercedes; Mr. Parker, Baguley, Mr. and Mrs. Hall, Woodley, 15-h.p. Panhard; Mr. Carter and Dr. Stanton, Market Deeping, 2¾-h.p. Royal George motor bicycles; Mr. Arrowsmith, and Mr. and Mrs. Cranshaw, Manchester, 12-h.p. Horbick; Mr. Heywood, Middleton, and Mr. Beasley, Rochdale, 5½-h.p. Humberette; Dr. and Mrs. Ferguson and family, Manchester, 9-h.p. Clement; Mr. and Mrs. J. Barber, Sheffield, 12-h.p. Belsize; Mr. A. Bennett, London, and Mr., Mrs. and Miss Lawton, Sheffield, 12-h.p. Clement; Mr. F. Lea, Bowdon, 12-16-h.p. Clement; Mr. and Mrs. D. Moseley and Miss Preece, Manchester, 12-h.p. Daimler; Mr. W. S. Foster, Mrs. R. M. Wright, and the Misses Nessler, Lincoln, 24-h.p. Georges-Richard; Mr. W. Nessler and Mr. W. Percival, Lincoln, 8-h.p. De Dion; Mr. R. M. Wright, and Mr. and Mrs. J. M. Gay, Lincoln, 12-h.p. Georges-Richard; Mr. and Mrs. Ward, Nottingham, 12-h.p. Humber; Mr. Tillwright, Rudgard, Lincoln, 12-h.p. Lanchester; Mr. F. Smith (President, Manchester A.C.), Bowdon, Mrs. Smith and Mrs. Thorp, Waite, York, 24-h.p. Mors; Mr. Hall, 24-h.p. Napier; Mr. Hollingbrake, Mr., Mrs., and Miss Time, Stockport, 12-h.p. Talbot; Mr. and Mrs. J. R. Richardson and Mr. W. S. Richardson, Lincoln, 16-h.p. Richardson; Mr. and Mrs. C. W. Rennell, Mr. W. R. Rennell, and Mrs. Newsum, Lincoln, 12-h.p. Richardson; Miss Hampton and Mr. and Mrs. Ridpath, Stockport, 60-h.p. Mercedes; Mr. H. M. and Mrs. Lowth, Baby Peugeot; Mr. and Mrs. Burley, Sheffield, 6-h.p. La Plata; Mr. and Mrs. Dodson, Manchester, and Mr. and Mrs. Whittaker, Wilmslow, 60-h.p. Mercedes; Mr. H. W. Lee, Mr. Lloyd Jones, and Mr. J. A. Bennett and Mr. Saville, Mr. Higginson, Mr. Hesse, Manchester A.C.; Mr. H. Artenfeld, Bolton, and Dr. Rowcliffe; Mr. L. C. Ingram and Mr. Rees-Jeffreys (A.C.G.B.I.), 12-h.p. Durkopp; Mr. Pickford and Mr. Lamb, Sheffield, and Mr. J. E. Kershaw, Eccles, 20–24-h.p. Spyker; Mr. G. H. Kirk, Mr. Brown, and Miss Crawford, Nottingham, 12-h.p. Georges-Richard; Mr. C. Evinson, Mr. and Mrs. Hill, 8½-h.p. Humber; Mr. Orchard, Derby, 9-h.p. Napier; Mr. Ward, Nottingham, 12-h.p. Humber; Mr. and Mrs. G. Linnell and Mr. and Mrs. Wade, Market Deeping, 10-h.p. Wolseley. The following members of the Sheffield Club:—Mr. Watts and party, 6½-h.p. Humber; Mr. J. E. Evans and party, 12-h.p. Darracq; Mr. A. J. Blyth, 3½-h.p. Quad; Mr. C. Hatfield and party, 6-h.p. De Dion; Mr. J. H. Pickford and party, 12-h.p. Wolseley; Mr. C. Bradbury, 6-h.p. La Plata; Mr. Beasley, 6-h.p. Wolseley; Mr. Turton-Chatterton, 6-h.p. De Dion; and Mr. and Mrs. B. Shaw, 6-h.p. De Dion; Capt. Lyall and Mr. C. J. E. Parker, Grantham, and Capt. J. A. Cole, J.P., Roxholme (Chairman of the Lincolnshire A.C.), 7-h.p. Panhard; Mr. C. Nelson and Mr. N. Bell, Lincoln, 4½-h.p. De Dion, and several others.

Berkshire Automobile Club.—On Wednesday afternoon last week Lieut.-Col. W. Waring, the hon. secretary of this club, entertained the members and their friends at Beenham Grange, near Aldermaston, when the visitors were favoured with a delightful afternoon. Some exquisite country is traversed *en route* for Beenham, which adjoins the main Bath Road. Unfortunately the recent gymkhana at Hall Place, Maidenhead, had prevented several members from joining in the present visit, in spite of the extra inducement offered of an inspection of Mr. Waring's fine stud of thoroughbred yearlings. Nevertheless a good showing of cars was made, amongst the vehicles on the ground being some excellent specimens of Wolseleys, Panhards, Lanchester, New Orleans, De Dietrich, Siddeley, Dennis, &c., while one or two motor bicycles and trailers helped to swell the line. Upon this occasion no competitions were arranged, but the visitors gave their time to the inspection of the charmingly laid-out grounds of the Grange, prior to being conducted by Mr. Henry Waring over his famous stables.

Derby Automobile Club.—A number of members paid a visit to Moor Court, Oakamoor, the residence of one of the vice-presidents of the club, Mr. Francis Bolton, last week. An innovation was inaugurated by the cars proceeding singly to their destination, arriving at intervals between three and four o'clock in the afternoon. This step was taken owing to the very dusty state of the roads, which would otherwise have militated very greatly against the pleasure of the afternoon, and detracted from the enjoyment of the glorious scenery of the surrounding country, which is such a remarkable feature of the county of Derby. Most of the cars took the road through Ashbourne, Mayfield, Ellastone, and Farleigh, which, although extremely hilly, is compensated for by the picturesqueness of the scenery. In view of the somewhat intricate turnings which prevail near Moor Court, Mr. Bolton had considerately placed "scouts," in the form of children, provided with green flags, who at doubtful corners pointed the way to the motorists as they successively came up. Altogether about 20 vehicles were present at the rendezvous, the host having thoughtfully added to the pleasures of the afternoon by providing a band in the grounds. A considerable amount of interest was taken in Mr. Bolton's new Daimler carriage, which he has just received, and which embodies the very latest improvements which the Daimler Company, Coventry, have introduced in their 1904 models.

At the invitation of Mr. A. J. Clay, another of the vice-presidents, the next run of the members is to the Ryknield Motor Works at Burton, Holly Bush Hall being visited afterwards for tea.

Eastern Counties Automobile Club.—From Ipswich to Felixstowe was the run on Saturday for the second fixture of the season of this club, the start being made from the Great White Horse Hotel, opposite the residence of the hon. secretary of the club, Mr. C. K. Moseley. A splendid gathering of well-appointed cars participated in the afternoon's outing, and created an enormous amount of interest amongst the townsfolk, both at Ipswich and Felixstowe. Rather dull and cold weather was experienced, but fortunately there was no dust, and the excellent provision made for the visitors at the magnificent new Felix Hotel sent everybody away in thoroughly good spirits for a run round the town, and thence along the undercliff road to the foot of Bent Hill, where a stiff bit of climbing had to be undertaken by the cars. Ultimately, with the exception of one car, the whole of the vehicles ascended, although in several instances the hill had to be taken running backwards.

For June 25th, the next run of the club, Clacton-on-Sea has been fixed as the destination, members meeting at the Manningtree Railway Station

EAST SURREY AUTOMOBILE CLUB.—The members and cars taking part in the inaugural run to Mr. J. B. Purchase's residence, "Backstone," Redhill.

East Surrey Automobile Club.—The opening run of the season of this club was held on June 4th, when at the invitation of Mr. J. B. Purchase, about 50 members and friends drove to "Blackstone," Redhill, where their host entertained them to lunch. A trip was then made to "Timberham," Charlewood, the residence of Mr. F. E. Charles, where tea was indulged in, this second function making a pleasant finish to the day's outing prior to the return of the members to their respective destinations. Amongst those who took part in the run were:—Major Kingsley, O. Foster (president), Mr. and Mrs. J. B. Purchase and party, Mr. and Mrs. E. K. Purchase, Mr. and Mrs. F. E. Charles and party, Mr. C. H. Whittington, Mr. and Mrs. A. Gunning Keen, Mr. J. Underhill and party, Mr. and Mrs. G. H. Bowden, Mr. H. Hughes, Mr. and Mrs. C. F. Wakefield, Mr. F. W. Ellwood, Dr. J. Hewetson and Mr. Frank Watney, Mr. H. Rosling and party, Mr. A. W. Makovski and party, Mr. J. Humphrey and party, Mr. and Mrs. Cleaver and party, Mr. W. F. Garside, Mr. D. J. Barry (hon. sec.), and Mrs. Barry.

Ladies' Automobile Club.—The following ladies were elected to membership of the club this week:—Mrs. Hornsey Drake, Lady Waldie Griffith, Mrs. Gunston, Mrs. R. W. B. Jardine, Mrs. J. P. Morgan, junr.

At the end of this month a "biograph tea," showing the Gordon-Bennett race in the Taunus will take place.

A ladies' run will probably be held the first week in July.

Leicestershire Automobile Club.—A very enjoyable run was made by this club last Saturday to Stratford-on-Avon, an early start being made, viz., at 10 o'clock in the morning. The route through Coventry, Kenilworth, and Warwick proved one of the most interesting in the Midland district, the lovely Warwickshire scenery being traversed under the most pleasant climatic conditions. After lunch at the Red Lion Hotel the usual round of inspection of the historical old town was made, including Ann Hathaway's cottage, &c. Boating was preferred by some of the members to whom Shakespeare's country was already familiar, and on the return journey halts were made at both Kenilworth and Warwick to enable the castles at both places to be visited, whilst at Coventry a few minutes were taken for replenishments of man and car.

Wolverhampton and District Automobile Club.—On Saturday last, members of the above club had their first non-stop run of the season to Llangollen. Twelve cars were entered, all of which completed the journey without any mechanical or tyre troubles. Altogether thirty-four members and friends met at the Royal Hotel, Llangollen, and returned on Sunday afternoon, a most enjoyable week-end having been spent. The following members drove:—Messrs. J. O. Evans, H. W. Evans, George H. Evans (10-h.p. Wolseley); S. R. Rhodes, Secretary (16-h.p. Ariel); T. F. Young (15-h.p. Star); W. G. Owen (10-h.p. Wolseley; E. Lisle, J. Lisle (12-h.p. Star); F. C. Bishop (7-h.p. Star); T. T. Mills (8-h.p. Sunbeam); F. B. Corker (6-h.p. Sunbeam); and Dr. Pratt (6-h.p. Mobile).

MOTOR CYCLING.

Non-Stop Motor Cycle Run.—On Saturday last the final competition for the S. F. Edge Trophy was successfully carried through, on the same road as the previous test, viz., between Redbourne and Stony Stratford. We gave last week the names of the 12 competitors who were entitled to continue for this run. All of these started on the first 100 miles test, at 3 a.m. on Saturday, with the exception of Hoffmann. Eight were left in at the start for the second 100 miles, whilst for the third 100 miles, owing to various small misfortunes and in several instances to exceeding the speed limit, only three were qualified to continue for this lap, these being Messrs. F. Hulbert (Hulbert Bramley), H. P. Mays (Vinco), and Johnson (Humber). Mays experienced difficulty with his carburettor, and was ruled out, being unable to start, the final struggle resting, therefore, between Johnson and Hulbert. Both successfully finished the 300 miles, and were re-started for a final 50. One of Johnson's tyres by this time was gradually deflating, and handicapped by this bit of bad luck, he had to give way to Hulbert, who, therefore, secured the trophy, Johnson taking second place, Mays being awarded the third position.

London-Edinburgh Motor Cycle Ride.—The following is the official list of the riders completing the distance within twenty-four hours, and thus qualifying for the gold medals and special badges offered by the Motor Cycling Club. This list is compiled after the committee have investigated each claim, and is in alphabetical order:—F. H. Arnott, C. E. Bell, C. W. Brown, D. E. Brown, A. Candler, H. E. Cowles, J. F. Crundall, H. J. Densham, Chester Fox, C. W. Hacking, J. Van Hooydonk, T. Hooydonk, H. P. Maffert, W. J. Milligan, J. H. Reeves, W. A. Sale, F. Silver, L. N. Young, W. H. Wells, H. Williamson, A. C. Wright. It will thus be seen that twenty-one riders have qualified. Twenty-two were reported at Edinburgh, but one has been disqualified.

Motor Cycle Union of Ireland Speed Trials.—The second of the series of speed trials under the auspices of the Motor Cycle Union of Ireland was held at the Velvet Strand at Portmarnock, Dublin, on Saturday last. The events were quite as successful as the first trials held about a month ago, and the suitability of the beach for speed work has been incontestably proved. As on the first occasion, the competing motor cycles were divided into three classes—under 120 lbs., under 150 lbs., and a third class unrestricted as to weight. The first two were run over a distance of a mile from a standing start, and the third, which was open to non-members as well as members, was run over a distance of 1 kilometre (1,096 yards) with a flying start. In the standing start classes, the speeds of the winning motor cycles were equal to about 37 miles per hour, and in the flying start class the speed of the winner equalled 42½ miles per hour. Results are appended:—

Class A.—One mile from standing start (confined to members riding cycles of 120 lbs. or under):

F. A. Wallen, 70 × 76 mm. Triumph; J. G. Drury, 64 × 70 mm. Triumph.

Class B.—One mile from standing start (confined to members riding motor cycles of 150 lbs. or under):

H. S. Huet, Minerva; F. A. Wallen, Triumph.

Class C.—One kilometre (1,096 yards), with flying start (open to members and non-members; motor cycles unrestricted as to weight; horse power limited to 3½):

1. L. R. Oswald Sealy, Dublin, 84 × 84 Excelsior, 54⅕ secs.
2. C. B. Franklin, Dublin, 70 × 80 F. N., 54⅘ secs.
3. H. S. Huet, Dublin, 82 × 82 James, 55⅖ secs.
4. F. A. Wallen, Dublin, 70 × 76 Triumph, 56⅘ secs.
5. B. Gannon, Dublin, 3½-h.p. Riley, 57⅖ secs.

Catford Hill-climb.—On Saturday last, in the presence of a very large crowd of spectators, this annual contest was carried through on the well-known Westerham Hill, over a distance of 981 yards, with an average gradient of 1 in 9½. In the motor classes the results were:—

Class I (Cylinder 70 × 70 mm.).—1. H. Tyler (Humber), 2 mins. 32⅗ secs. 2. A. A. Chase (Chase), 2 min. 33 secs.

Class II (exceeding 70 × 70, but less than 80 × 80 mm.).—1. A. A. Chase (Chase), 1 min. 43 secs. 2. W. W. Genn (Eland), 1 min. 43⅗ secs. 3. F. W. Chase (Chase), 1 min. 50⅕ secs. 4. J. J. Leonard (Lurquin Coudert), 1 min. 52⅖ secs.

In Class II. there were 34 entrants of whom 25 started.

The Motor-Cycle Reliability Trials.—It has now been decided that the long distance trials being organised by the Auto Cycle Club shall be held from August 15th to 20th next. This was finally decided upon at the meeting of members of the club and the trade, held last week, when an organising committee was duly elected. The trial will consist of six out and home runs, two of which will extend to 200 miles, and the remainder to 150 miles each, making a total of 1,000 miles. There will be no private owner class, and hill-climbing competitions are to be substituted for speed trials on the track.

A motor bicycle run over 135 kiloms., organised by the *Cote d'Azur Sportive*, from Nice and back *viâ* Turbie, Mentone, Monaco, &c., was carried through at the end of last week. 24 entries were received; 16 machines started, and 10 completed the course. At Cannes a speed test for 300 metres, with a standing start and a "standing stop," formed part of the trial, in addition to a hill speed test over a kilometre on the Turbie Hill, and a kilometre on the flat at St. Cassien (near Cannes), upon which combined data the judges determined their awards. The official decision is not yet announced, but Lamberjack, on a 2¾ h.p. Griffon, appears to be the favourite for first place.

AERONAUTICS.

On Friday the 10th inst., M. Santos Dumont started from Paris *en route* for New York, and took the *Savoie* at Havre—his No. 7, packed in its six different cases, having already arrived on board beforehand. M. Dumont anticipates recommencing his experiments at St. Louis the first week in July. Just before leaving he gave his opinion to one of our French contemporaries about the St. Louis competition. He regards it as an exceedingly difficult one; to reach the velocity of 20 miles per hour on three separate occasions and maintain it over the L-shaped course is, in his view, a very exacting condition considering the present position of navigable ballooning. In spite of this, M. Santos-Dumont, however, is fairly confident of success, and only regrets that he has not more competitors, as the fight, he thinks, would then be more interesting.

In reply to several enquiries, the present London address of the Elswick Motor Company, of Newcastle and London, is 66, Great Russell Street, W.C. We announced this some little time ago, but the old address in Oxford Street has for some few weeks been appearing in the advertisement of the Company. Hence the query which has arisen.

On Tuesday evening the Junior Institute of Engineers paid a visit to the Motor Car Works of Messrs. D. Napier and Son at Acton Vale, W.

According to the *African Review*, a motor car service has been started in Pretoria, the scale of fares being the same as for cabs.

An opportunity will offer to see the Pedrail—that remarkable mechanical "elephant"—in operation at the Royal Agricultural Society's Show taking place at Park Royal from the 21st to the 25th instant.

The cryptogram maniac has been let loose on the names of the competitors for the Gordon-Bennett Race, and he finds that different arrangements of the names of the competitors each provide a cryptogram which might be interpreted as showing that eight of the whole number are likely to win. Like most oracles, therefore, this attempt is likely to console nearly everybody.

DOINGS OF PUBLIC COMPANIES.

NEW COMPANIES REGISTERED.

Martin, Smith, and Co. (Limited), 69, Hatton Garden, E.C.—Capital, £2,000 in £1 shares. Object, to carry on business of manufacturers and dealers in tyres, cycles, motor cars, carriages, &c. First directors, H. A. Martin and A. P. Smith.

The Motor Agencies (Limited), Scotch Co.—Capital, £5,000 in £10 shares. Object, to carry on the business of motor agents, &c.

Simpson and Bailey (Limited).—Capital, £1,000 in £1 shares. Object, to acquire the business carried on by A. L. Abraham, at 14, Pembridge Road, Notting Hill, as Simpson and Bailey, manufacturers of, and dealers in cycles, motor cars, and motor cycles, &c.

Tyre Syndicate (Limited), 37, Great Marylebone Street, W.—Capital, £1,000 in £1 shares. Object, to manufacture and deal in tyres of every description, and make component parts, fittings, and accessories of all kinds of motor and other carriages, &c.

J. I. Thornycroft and Co. (Limited).—The directors of this important company have issued a circular to their shareholders announcing the necessity of acquiring more convenient premises to enable them to retain their proper share of Admiralty work. A suitable yard has been arranged for in one of our leading ports—we have reason to believe Southampton—and in the event of the scheme, as put forward by the directors, being sanctioned, the business of the Thornycroft Steam Wagon Company, Limited, will be incorporated with the larger company, arrangements having been made for its purchase at a price to be arrived at by a joint valuation. It is proposed to make a fresh debenture issue for the purpose of the scheme. The present works at Chiswick, which are now thoroughly well equipped and up to date, will be retained for doing small marine, engine, motor car and wagon, and general work, while the building of larger boats and repair work will, by degrees, be transferred to the new yard. The combined profits, as shown by the last published balance sheets of the companies, after payment of debenture interests and preference dividend, would be sufficient to admit of the payment of a dividend of 8 per cent. on the ordinary shares on the new capital basis which is put forward under the present scheme.

LAW.

Napier *v.* Jarrott.—In the Appeal Court, judgment was, upon the suggestion of the Court, reserved in the appeal lodged by the defendant, to give the parties an opportunity of coming to terms.

BANKRUPTCY COURT.

Motor Manufacturing Company (Limited).—On the petition of Frank E Beadle, a debenture-holder and a director of the company, a Receiver was appointed by Mr. Justice Joyce on Tuesday this week.

THE AUTOMOTOR JOURNAL

A RECORD AND REVIEW OF APPLIED AUTOMATIC LOCOMOTION.

Circulates amongst Makers and Users of Motor Cars, Cycles, etc., in the United Kingdom, the Colonies, and the Continent.

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GORDON-BENNETT RACE IN GERMANY.—After Théry had won on the Georges-Richard-Brasier Car the Emperor of Germany sent specially for M. Brasier, the designer of the Car. Our picture was taken at the moment that the Emperor was congratulating M. Brasier. The other members of the A.C. de France present are Baron de Zuylen, Comte Chasseloup Laubat, M. Dumontpallier, M. Henri Menier, Ch. R. de Knyff, and M. Huillier.

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DIARY OF FORTHCOMING EVENTS.

British Events.

1904.	
July 2...	100 Miles Passenger Trials (Motor Cycling Club).
July 2...	Pot Bank Hill Climb (Yorkshire A.C.).
July 9...	Driving Cup Contest (Derby A.C.).
July 23	Sunrising Hill Climb (Midland A.C.).
July 26-27	Reliability Trials for Motor Boats.
July 30	British International Cup for Motor Boats.
Aug. 15-20	Motor Bicycle Endurance Trial. (Auto Cycle Club).
Aug. 20	Hill Climb (Derby A.C.).
Aug. 27	Challenge Cup for teams of 6 (Motor Cycling Club).
Aug.	Hill Climb (Kent A.C.).
Sep.	Midland A.C. Speed Trials.
Sep.	Inter-Club Hill Climb, with Teams.
Sep.	250 Miles Trial (Motor Cycling Club).
Sept....	*Reliability Trials.
Sep. 10	Lanark Hill Climb (Scottish A.C.).
1905.	
Mar. 3-11	Liverpool Motor Cycle Show.
Apl. 1	*Light Van Trials.

Foreign Events (Trials, Races, &c.).

1904.	
July 10	Mont-Cenis Hill Climb (A.C. Italy).
July ...	Speed Trials (*L'Auto*).
July 15-23	Ostende Week.
July 15-20	Ostende Motor Boat Races.
July 17	Antwerp-Ostende Motor Boat Run.
July 25-26	Circuit des Ardennes (A.C. Belgium).
July 26-Aug. 1	Spa Automobile Fêtes.
Aug. 8-9	Calais-Dover-Calais (motor boats).
Aug. 10	Calais-Boulogne-Calais (motor boats).
Aug. 14-20	Paris-Deauville Motor Boat Race.
Aug. 18	Semmering Hill Climb (A.C. Austria).
Aug. 22	Motor Boat Race for Gaston Menier Cup.
Aug. 22-Sept. 4	Paris Industrial Vehicles Trials (A.C. France).
Aug. 28	Ventoux Hill Climb (Avignon).
Sept. ...	Deauville Automobile Meeting (*L'Auto*).
Sept. 2	Chateau Thierry Hill Climb (*L'Auto*).
Sept. 10-12	Lucerne Motor Boat Races.
Oct. 8	Vanderbilt Cup Race (A.C. America).
Oct. 9	Gaillon Hill Climb (*L'Auto*).
Oct. 14-22	Leipzig Cycle and Motor Show.
Nov. 20	100 Kiloms. Trial (A.C. Algeria).
Dec. ...	Paris Salon.

* Automobile Club of Great Britain and Ireland Events.

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PASSING EVENTS.

The Gordon-Bennett Race.

WHATEVER may prove to be the future of the Gordon-Bennett Race as an international event, the race of 1904 will always remain a memorable one. Never before were the competing cars so highly powered, nor had any previous course, over which the races of other years have been run, made such extreme demands upon the readiness, nerve, and resource of the drivers. The course was a difficult one, and under these circumstances the fact that higher speeds were attained than on any former occasion is not only a proof of the improvement which has taken place in the manufacture of racing vehicles, but a testimonial to the increased skill in controlling cars at high speed, and under difficult circumstances, which the leading drivers have acquired. It would be too soon to dogmatise as to what the race will teach us from the engineering point of view. Further particulars than are at present available, in regard to the breakdowns that occurred to the unsuccessful competitors, are needed before those points can be appreciated.

As a sporting event—as a race pure and simple—this year's Gordon-Bennett has had no equal. The French and German champions, at any rate, proved to be most equally matched, and the driving of both of them was superb. The excitement of witnessing a race could hardly by any possibility exceed the point reached between the moment when Jenatzy finished his fourth round and the instant when the approach of Théry was heralded. The English competitors were unsuccessful, it is true, but they all drove well and pluckily, and two of them, at any rate, completed the whole course in excellent time. In fact, a feature of the race was that the times of all the competitors, who were not prevented from finishing by some accident, were excellent. As regards Mr. Edge, everyone must feel the sincerest sympathy for him, for during the whole of the three rounds which he completed, he was driving splendidly, and his car travelled in fine style and at high speed. Had the car enabled him to maintain the performance of his first and third rounds throughout, he would have obtained a very high place. As a driver, he fully maintained his great reputation, and showed himself to be the equal of any of the other competitors.

As regards Girling, it must be remembered that he was driving one of the lightest powered cars in the race. In spite—perhaps because—of this, he did admirably in the first two rounds, and, had his engine kept running as well throughout, he would in all probability have come in third. He was defeated by sheer bad luck—mud getting in between the float and the nozzle of his carburettor. Jarrott drove extraordinarily well, and considering the troubles he encountered, there are few drivers who would have got home in such excellent time. It was at one time suggested that the accident of last year might affect his nerve. His admirable performance in this year's race is the best possible, and most complete, refutation of any such suggestion, for both he and his responsive Bianchi must have had all their wits about them.

The way in which the race has been reported in the daily Press perhaps rather tends to diffuse the impression that the English cars and drivers made a fiasco. Nothing could be more misleading. Though they were unsuccessful, their performance was most creditable, and with the one exception of the year when Mr. Edge won the race, no English representatives have ever done as well.

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The Race as Diplomatist.

The enthusiasm of everybody present was extraordinary, and it seems quite certain that it would not have approached what it was, or, indeed, have existed at all, if, instead of a real race the competition had merely been some kind of reliability trial. The Germans undoubtedly hoped, and, indeed, almost expected, to win the Cup once more, and so the whole-hearted way in which they cheered the French winner, and the reception they gave both to him and to all the Frenchmen present, was creditable in the extreme. In this respect, the Emperor set a graciously generous example, and the genial spontaneity with which he instantly congratulated Baron de Zuylen produced a most favourable impression on all the French spectators present. It is a significant fact, when one comes to think of it, that the cry of "Vive l'Empereur!" which his action evoked from the French quarter of the grand stand has not been heard on German soil for very nearly a hundred years, and then under vastly different circumstances. The Gordon-Bennett Race of 1904 seems to have practically completed the good effect of the Paris-Berlin Race of 1901, in removing any traces that may still exist of the old unpleasant feeling between Frenchmen and Germans. From this point of view, previous international motor car races have proved the best of diplomatists, and the Gordon-Bennett Race of 1904 has proved more effective than any of them.

Most members of the House of Hohenzollern have been enlightened and far-seeing, and several of them—the great Frederick pre-eminently—took the liveliest interest in mechanical improvements and commercial development. The present Emperor is the worthy heir of his ancestors, and holds the same kind of enlightened views that enabled Frederick the Great to convert his little monarchy into one of the strongest states in Europe. He has recognised the importance of the automobile movement. He has all along encouraged it heartily, and now he has given the crowning proof of his interest in it, and conviction of its importance, by being personally present at the great race. He has thus conferred on this year's Gordon-Bennett contest the distinction of being the first automobile race witnessed by a crowned head, the race in Germany being thus sharply distinguished from the Irish event of last year, at which not even a single member of the Royal Family was present. The German Emperor's far-reaching views enable him to fully appreciate the value and importance of the industry, and the effect which such races have had in developing it. But it was probably quite as much to his recognition of the splendid opportunity which the race offered for conciliating French opinion, that his presence on the course should be attributed. International competitions have always tended to promote international good feeling. International automobile races have done so particularly, and the Gordon-Bennett more than any. From this point of view alone, therefore, it is to be ardently desired that it may for long continue to exist as an international institution, and produce equal, or even greater, beneficial effects.

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A Homicidal Trap.

In the days of agrarian outrage in Ireland, it used to be the custom of tenantry who desired to get rid of a landlord on whom they did not wish to waste powder and shot, to stretch a wire across the road over which he was expected to drive home in the evening, and arrange it about the level of the landlord's neck. This was usually effective in either killing or seriously injuring the landlord. The same tactics seem to have been adopted in a new form of motor car trap on the Maidenhead road, into which Mr. W. F. M. Partridge nearly fell last Sunday. A wire was fastened to two telegraph poles on opposite sides of the road. It was dark when Mr. Partridge approached it, but, fortunately, the lights of his car enabled him to see the wire before touching it, and to beat it down with his hand. It came into contact with the steering pillar and broke. Unfortunately, little doubt can be entertained that the attack was a deliberately-planned outrage, prompted by a detestation of automobilism approximating to homicidal mania. Anti-motorists have often endeavoured to injure car drivers before, either by distributing "ironmongery" about the roads, as practised by the Llangollenites, or by firing shot guns at their tyres, as recommended by Sir Ralph Payne Galwey. Butchers also (of Ripley), hit them on the head with stout cudgels, but this is the first attempt to deliberately murder an automobilist, whom, as far as can be judged, the miscreant arranging the trap had never seen. He simply desired to whip off the head of any passing automobilist, and gloat over the exploit afterwards. Robbery could hardly have been the object, as the wire could scarcely have injured more than the occupants of the front seat, and cars as a rule on Sunday, may be relied upon to contain more than two passengers. The incident is a very unpleasant example of the Juggernaut mania in excelsis. As on the same road a motor cyclist was recently injured by having a heavy stick hurled at him, it is satisfactory to learn that the police believe themselves to be in possession of a "clue."

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The Engine as Brake.

Mr. Staplee Firth distinguished himself in a recent case, to which we alluded a few weeks back, by arguing and apparently convincing a bench of magistrates, that the boiler of a steam car, though it might be a generator, was at any rate also an "accumulator" within the meaning of the Act. Mr. Firth has now been successful in persuading Mr. Lane at the West London Police Court that the engine of a steam vehicle is most unquestionably a "brake" as well. One of Messrs. Pickford's vans was summoned under the Act for being only provided, as was alleged, with one brake. Mr. Firth explained to the magistrate that though the car might *appear* only to have one brake, it was really provided with two, the other brake being the engine. Evidence was given of the mechanical construction, and of the fact that the steam engine could be used as a very powerful brake, and Mr. Lane held that the steam engine on the motor car, including the valve arrangements and the reverse gear, constituted a very satisfactory brake for the motor car, and the case was dismissed. Even if some people may be feeling a degree of interest as to the next thing that portions of a steam car will be made out to be, still Mr. Lane's decision certainly would appear to be a correct interpretation of the law. Any fitment on a car that can be effectively used as a brake is, we think, a brake within the meaning of the Act, and there is no doubt that the engine of a steam vehicle can be effectively used for this purpose. It is not, however, beneficial to all self-propelled vehicles to "pull them up" by this means. Still less satisfactory as a brake is the engine of the petrol vehicle. The law, apparently, does not require two brakes on a steam car in addition to the engine, but manufacturers would in general be well advised to provide them.

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When is a "Brake" not a Brake?

It is, of course, the facility with which the engine on a steam vehicle can be reversed that enables it to be so readily and effectively used for retarding the progress of a car. On the level, naturally, this would simply mean reversing the direction of travel, and, consequently, on a declivity means reducing speed. Being able to use the engine fairly satisfactorily in this way is an advantage that the steam car possesses over the majority of petrol cars, in which to put in the reversing gear, keep the engine running, and employ the clutch, would be impracticable. Even with the steam car, however, it must be borne in mind that a brake is, as a rule, only employed when a car has acquired a certain amount of momentum, and that to reverse the engine under these circumstances is putting a severe strain on all the parts, and one which they were not originally designed to withstand.

At first sight, such petrol cars as are provided with an epicyclic reversing gear may appear to resemble steam cars in regard to the braking effect that can be obtained. With these reversing gears, the reverse is brought in gradually by a brake-strap, and when pressure is exerted on this strap the effect is either to reduce the speed of the car or to first stop the engine and then drive it round backwards. It is this latter alternative that forms one weak point about the arrangement, considered as a brake, although it would be seldom that the gradient would be steep enough, or the momentum great enough, to actually bring about this result, and the car would under most conditions be successfully brought to rest. When employed, however, this method is just as likely to put injurious strains on the transmission as reversing a steam engine.

Both these "brakes," therefore, should be looked upon as merely emergency devices, which may be employed if either of the ordinary brakes of the vehicle goes wrong. In the best case, they are using the machinery for a purpose for which it was not designed, and therefore it would appear to be far preferable to supply the vehicle with two good ordinary brakes, and only to use the steam engine or the epicyclic reversing gear if it became necessary to do so owing to both the brakes having unexpectedly got out of order. Besides which, such "brakes" as these are apt to stop the vehicle more quickly than the *passengers*, particularly if they happen to be injudiciously applied by an inexpert hand.

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Danger to the Industry from Inconsiderate Idiots.

The summer is upon us—with its dust. As a consequence, the Juggernaut of last year which was killed by ridicule, decently buried at the end of the year, and lay quiet in its tomb during the rainy period, is issuing forth once more in a fresh *avatar*. It is now "the infernal machine." At least, that is the name bestowed by Captain Donelan, who, in the House of Commons, inquired whether "any records were kept of the number of persons killed and injured by these infernal machines." With Dr. Farquharson's lucubrations in a similar sense we have already dealt.

It is particularly unfortunate that just at the time of the year when the anti-automobile movement usually breaks out with particular virulence (last year it bordered on frenzy as the dog-days approached), there should be a considerable amount of complaint of reckless and careless driving by automobilists on the roads round London. Lieut.-Col. Waring, the Hon. Secretary of the Berkshire Automobile Club, sends us a letter complaining of the excessive speed frequently maintained by cars in the neighbourhood of Reading and Newbury. He also complains of the inadequate use made of the horn when approaching cross-roads, and of the reprehensible practice of hanging a spare tyre-cover over the back of the car so as to obscure the rear number. When a man in Lieut.-Col. Waring's position, the official mouthpiece of an important club, thinks it necessary to protest in this way, it is obvious that there are still, unfortunately, many motorists who do not adequately observe the courtesies of the road. That they should select this particular time of the year for giving free rein to their cynical disregard of the rights and convenience of other road users, marks them out both as senselessly short-sighted and as the real enemies of the automobile movement. As we have repeatedly pointed out, automobilism under the present Act is on a three years' probation. If the smouldering hostility that always exists towards what is new, useful and progressive, is fanned into flame by short-sighted action of this kind on the part of automobilists themselves, and if this year and next the result is to provoke similar outbursts of animosity to that which preceded the passing of the 1903 Act, it is much to be feared that the next Bill will be even more drastic and draconic in its provisions. Should this prove to be the case, the industry will have to thank the inconsiderate idiots of whose behaviour Lieut.-Col. Waring so justly complains.

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And Earl Russell's Advice to Them.

For the benefit of these endangerers of the future of automobilism, we should like to draw attention to Earl Russell's article on the "Courtesies of the Road," contributed to a recent number of the Automobile Club *Journal*, and, if we could, compel them to read it. Probably they would not follow his maxims, but some good would ultimately result from their at least being informed how gentlemen should behave on the high road. Without giving in detail all that Earl Russell says, it is sufficient to remark that all his recommendations involve the detailed and careful observation on the road, of that spirit of courtesy which should prevail in every occupation in life. The tendency of the whole paper is well illustrated by the statement that "In going through towns and villages it is not sufficient to know, one's self, that the car is under control — it ought to be driven in such a way as to make it clear to the ignorant public that there is no danger. In this connection, both pedestrians and dogs, however unreasonable, should be treated with respect. It is not enough not to run over a pedestrian. It is also one's duty not to frighten him."

One matter Earl Russell does not mention, and it is a point on which automobilists would do well to exercise a certain amount of consideration. The annoyance to the public is, nine-tenths of it, a matter of dust, and dust is to a very large extent a matter of speed. Speeds through populous villages and country districts, to which no one would object in wet weather, excite fury in the inhabitants in dry and dusty weather. Where roads are dusty, and the population thick, therefore, automobilists will be sacrificing something for the general good of the industry if they would drive as slowly as they can afford the time to do, and so diminish, as far as possible, the clouds of dust they leave behind them.

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The Automotor as a Pest Exterminator.

It may be as well to draw the attention of anti-automobilists to the fact that some of the nuisances of our roads are apparently being eradicated by the automobile. Some time ago, we drew attention to the fact that tramps were becoming much rarer on the high roads since the general introduction of the new locomotion, tramps not being usually men of strong nerve, and being accustomed to appropriate the whole of the road to themselves. A country coachman, who is not favourably disposed to motor cars for obvious reasons, has noted that they are eliminating the common or garden fly—(also the horse fly) as well. The country coachman has a theory. Before the introduction of the motor, he observed that the flies used to wait in the hedges till he and his horses came along, and then swarm down upon them like a Ghazi charge. When motor cars were first introduced, the coachman believed that the flies adopted the same tactics, but burnt themselves on the engine or exhaust pipe, were suffocated by the dust, or smothered by the petrol. In this way most of the flies have been eliminated, and the survivors have fled from the high roads. This testimony from an opponent, even if his theory is not accepted in its entirety, is very valuable, and should go a long way towards conciliating the enemy. When any anti-automobilist feels exasperated by the onward rush of a passing car, he should control himself, and call to mind that the machine in question has eliminated the tramp and is now exterminating the fly from our English roads.

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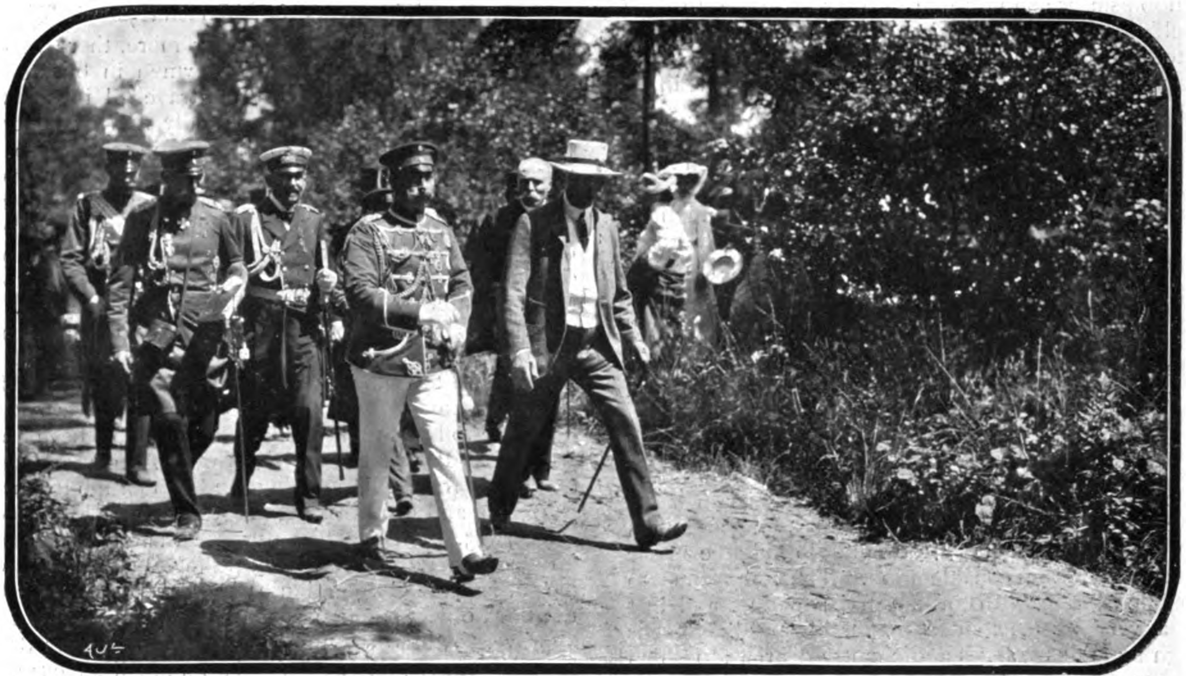
Whitewash for Maidenhead.

A hundred years ago, or rather more, there used to be a select confraternity of highwaymen in business on Hounslow Heath, and, unless you travelled in considerable numbers, or were an unusually straight shot with pistols, or preferred death to surrendering your cash, you were frequently relieved of that commodity between Maidenhead and London. The highwaymen have passed away, mostly at Tyburn, but their spirit survives in the Maidenhead Corporation, who since 1835 have, without the least show of legality, "relieved" the public of a trifling matter of £140,000, collected in bridge tolls. To this the Corporation has had no shadow of right, and it was only as the result of the public-spirited action of Mr. Taylor, assisted subsequently by the Motor Union, that, as we mentioned in The Automotor Journal at the time, the toll was removed. A Bill has now been introduced into Parliament for the three objects of freeing the bridge from toll, enabling the Corporation to borrow £20,000, and indemnifying them for their illegal action since 1835. For the first purpose there was obviously no need to introduce a Bill at all. The tolls were illegal, and the Corporation had to abandon them. But the third object is one of which we feel quite unable to approve. All users of the road over Maidenhead Bridge have for nearly 70 years suffered from the illegal exactions of the Corporation. They are now to receive an indemnity for thus preying upon the users of one of our principal roads, and the Bill has passed a second reading. Local and municipal authorities are only too frequently inclined to treat the rights both of the public and of their constituents with the scantiest consideration. The general growth of the belief that they can act as illegally as they like, and still may be certain that Parliament will grant them an indemnity, is but too well calculated to have the effect of making such bodies feel themselves above control and above the law.

A petrol chemical fire engine, driven by a 12-h.p. Aster engine, has, we hear from our correspondent in South Africa, been for some months in use in Cape Town. It carries two chemical extinguishers, and can take 1,500 feet of hose, with all stand-pipes and connections, up any hill in Cape Town.

THE 1904 RACE FOR THE GORDON-BENNETT CUP.

THE great International motoring event of the year has come and gone. It may be said at the outset that the 1904 race for the Gordon-Bennett Cup will be as memorable as any that have preceded it, though for somewhat other reasons. It is, at any rate, the first occasion on which the meeting has been honoured by the presence of a reigning monarch. Never before have the competitors been so numerous or their mounts so powerful, or, considering the difficulties and complexities of the course, the speeds attainable so high as on the Taunus course throughout Friday of last week. That France should once more regain the trophy, which for two years past has been lost to her, can only add to the keenness of the growing interest that is taken in the annual event by the public at large, while from the motorists' point of view Théry's win was a satisfactory and well-merited one in every sense of the term.



GORDON-BENNETT RACE IN GERMANY.—The German Emperor makes the pace through the forest during one of the intervals between the Circuits.

Homburg was indeed *en fête*. German towns on such occasions usually rejoice whole-heartedly. Homburg is accustomed to *fêtes* on a more or less extended scale, and knows how to rejoice. This time it was more *en fête* than ever before, and it seemed as if nearly all the flags in Germany must have been collected for the occasion. Bunting flapped from every window. Flags hung in festoons across the streets—so thickly that in places one could hardly see the sky. Flagstaffs sprouted from the roofs, and the banners they carried twined themselves lovingly round innumerable chimney-pots. The population, townspeople and visitors alike, were fairly motor-car mad, and all those who, as hotel proprietors, shopkeepers, or letters of lodgings, were deriving profit from the enthusiasm, did their utmost to fan it. Even ordinary cars were objects of benevolent interest. When a racer came along it was hailed as an attractive prodigy, and if one came to a stop in the town it was instantly surrounded by a throng of admiring votaries. And music there was of all kinds to enliven the proceedings, from the relatively exalted brass band to the cheap Tingel-tangel, patronised by the working classes and some of the peasantry, where the music was of a less choice order, and the time kept not such as to increase regard for the Germans as a nation of musicians. Of course, behind the enthusiasm there was, as we have already hinted, a good deal of self-interest, and it was well illustrated in the case of one hotel proprietor, who had laid himself out specially to attract the custom of French visitors, to which end he had hoisted a huge tricolour on his establishment. "In vain, however, is the net spread in the sight of any bird," and the Frenchmen passed on to other establishments, whereupon the proprietor's enthusiasm for "La grande Nation" underwent prompt modification, and he hauled down the flag of the Republic with disgust.

Many of the hotels were thronged with society of "the highest circles," so elevated in social position, indeed, that the gentlemen quite frequently and in all apparent seriousness saluted the ladies by publicly kissing their hands, to the no small wonder of many of the English visitors, whose interest was further stimulated by the custom apparently gradually creeping in among the "golden youth" of the Fatherland of parting their hair carefully down the back.

The highest circles, too, appeared somewhat *blasé*, so *blasé* in fact that even the exertion of eating seemed too

GORDON BENNETT RACE IN GERMANY.—At Usingen Outward Control. Some of the drivers on their cars (from photographs by Mr. Frederic Coleman).
1. Jenatzy (Germany). 2. Lancia (Italy). 3. De Crawhez (Belgium). 4. De Caters (Germany). 5. S. Girling (England). 6. Salleron (France).

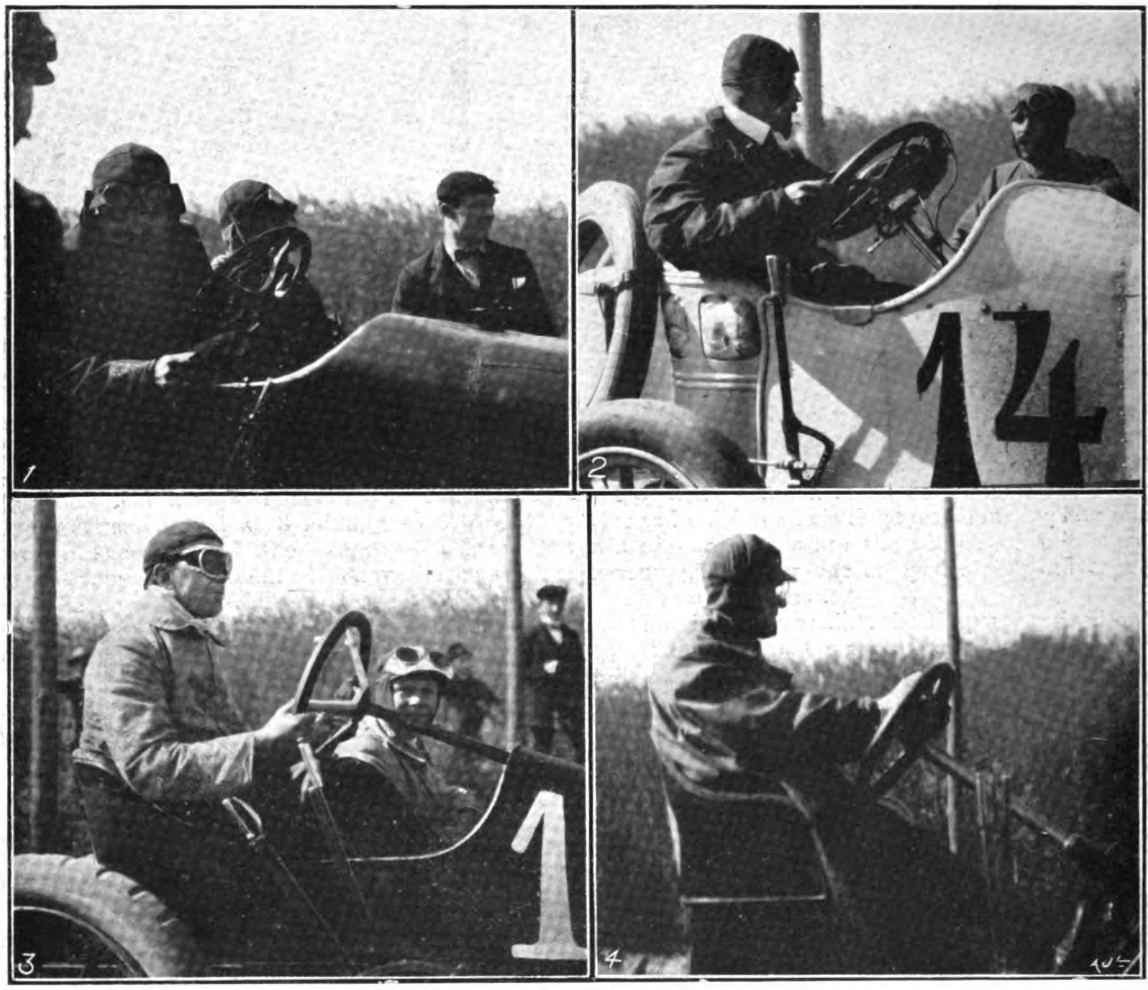
much for them, and they had to urge themselves through table d'hote by interlarding the courses with cigarette-smoking—and ices.

For the weather was fine and hot, too hot for visitors from the British Islands, to whom the sudden transition in the twenty-four hours' journey from an almost uncomfortable coolness to a heat which rendered all exertion a burden trying in the extreme, was unexpected, not to say overpowering. Even in cool weather Homburg is relaxing. On the day of the Gordon-Bennett Race the temperature was suggestive of the world-to-come.

Though private individuals were keen set on making a pecuniary harvest while the Gordon-Bennett sun shone, the electric tram authorities held themselves aloof from the sordid struggle, and almost scornfully refused a proposal to run a couple of special trams for the benefit of the Press before the morning service commenced. As £25 was offered for this accommodation it would have left a handsome margin of profit. The profit, however, would not have gone into the pockets of the officials—*ergo!*

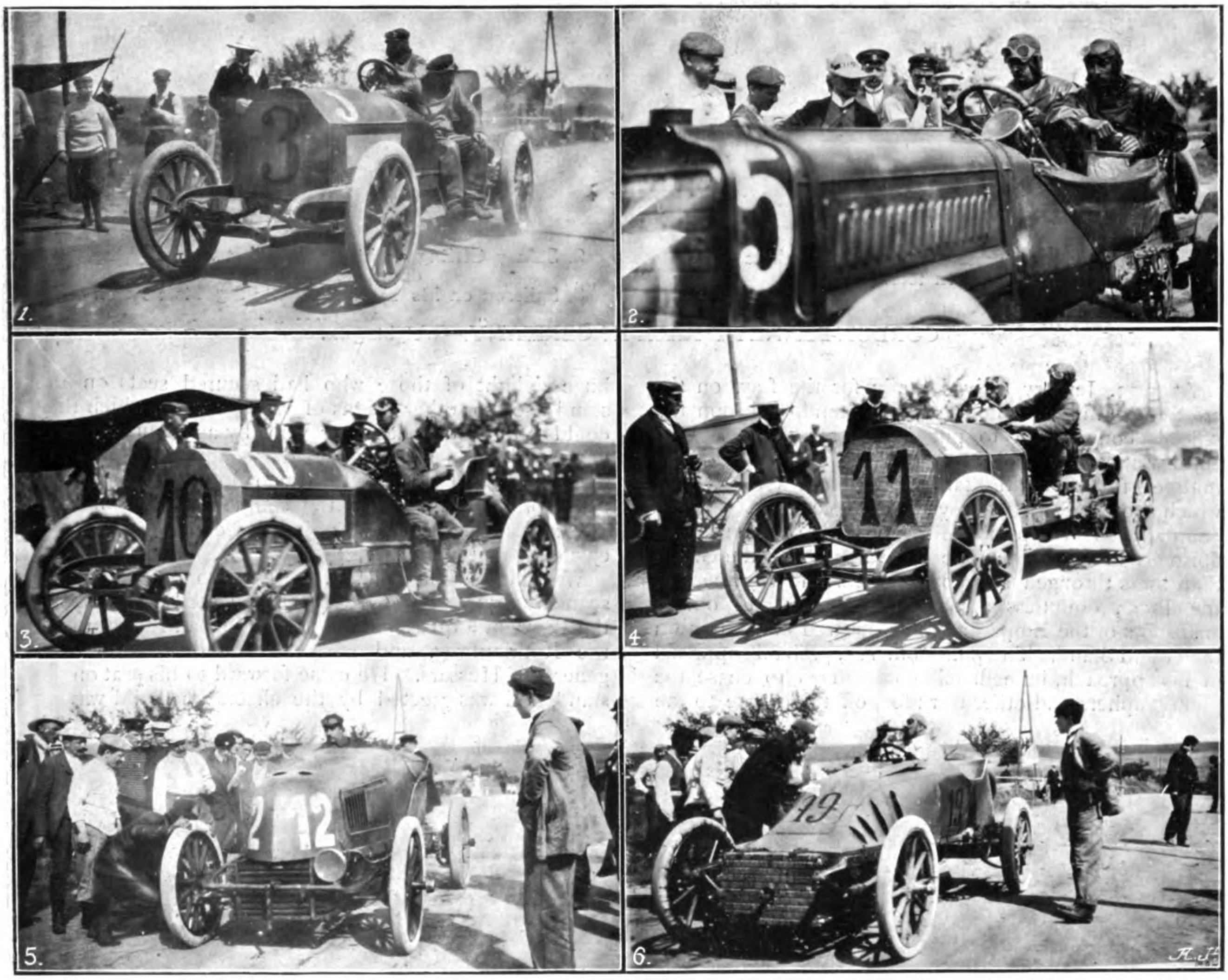
From the point of view of the visitors, the 1904 Gordon-Bennett meeting really began with the weighing in of the cars in Elizabethen Strasse, on the morning before the race, the formality occupying the best part of the day. Tedious though such spectacles must of necessity be, the keenness of the interest manifested in the proceedings is worthy of remark. As a fact, the function was productive of a single incident only. This occurred about ten o'clock in the morning, when, owing to sheer thoughtlessness, a bystander let drop a lighted match at a spot where petrol was being drawn off from Fritz Opel's Darracq, preparatory to weighing in. The instant result scarcely needs description. The street was aflame for yards, tongues of fire springing up in all directions. The Teuton is usually credited with being of phlegmatic and serene temperament, but the conduct of the crowd which strove to disperse helter-skelter in all directions sufficiently attested that the generally-accepted impression, like many others, was not borne out by facts. Five cases in which ladies got thrown down and trampled on came under our personal observation, and assuredly there were other instances in plenty. As the event proved, some shovelfuls of sand, and the use of sacks to beat out the fire, quickly checked the progress of the fire, which at no time threatened serious danger, and was readily smothered.

Unfortunately, however, the day did not pass off without a fatal accident. Many motorists spent the morning and afternoon going over the course, parts of which the German Emperor himself inspected, His Majesty having arrived with the Empress in the morning. Cars were speeding in both directions, and the confusion that prevailed in regard to observing the rule of the road was such that mishap was inevitable. Some drivers seemed to forget their common sense, motoring becoming exceedingly dangerous in consequence. Valuable touring cars that had come to more or less grief were encountered, on an average of about one in every five miles of the course. Some had nothing worse than their bonnets stove in through being made to charge banks, telegraph poles, or pine trees in the



GORDON-BENNETT RACE IN GERMANY.—At Usingen Outward Control. Some of the drivers on their cars (from photographs by Mr. Frederic Coleman).
1. Augieres (Belgium). 2. Fritz Opel (Germany). 3. C. Jarrott (England). 4. Warden (Austria).

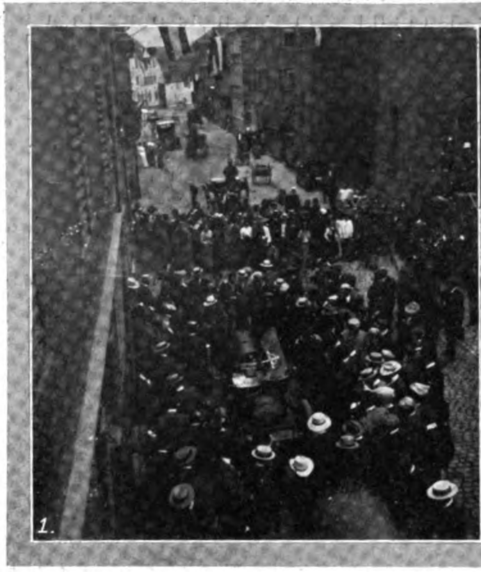
endeavour to avoid collision with approaching vehicles. Others sustained broken wheels and similar fractures, being overturned by the roadside. Mishaps of this sort were too numerous for separate mention, but the fatal accident which befel Baron von Leitenberger must be recorded, as well as that to Herr Mühling, proprietor of the Hotel de Rome in Unter den Linden, Berlin. The former sustained a fractured spine, but lingered on until Saturday night, his death being first made known in Sunday's issue of the *Frankfurter Zeitung*. Baron Leitenberger's body has been conveyed to Austria for interment. The Baroness, as well as the driver of the car, sustained injuries from which they are not yet recovered, the latter being especially hurt about the head.

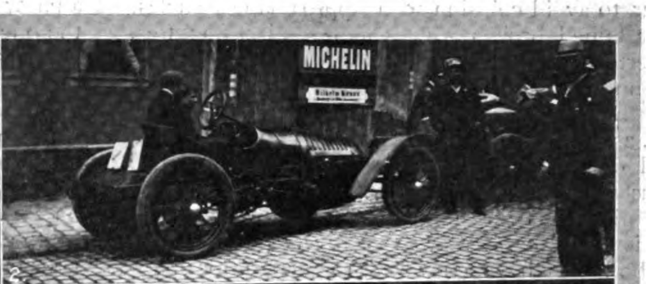


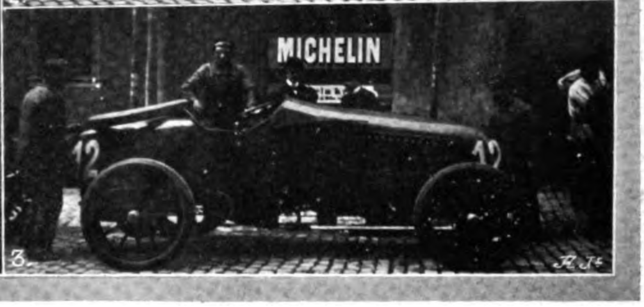
GORDON-BENNETT RACE IN GERMANY.—At Usingen Outward Control. Some of the drivers on their cars (from photographs by Mr. Frederic Coleman).
1. Werner (Austria). 2. Thery (France). 3. Braun (Austria). 4. Storero (Italy). 5. Salleron (France). 6. Hautvast (Belgium).

The dawn of the great day was gloriously clear and bright, and a poetical Frenchman, convinced that his country would win the Cup, and gifted with historic imagination, was heard (striking a suitable attitude) to quote "It dawns like Austerlitz!"

Eager as the holiday-makers were to be on the scene, there was one man who surpassed them in sheer anxiety to be there betimes. Need it be said that the one man in question was none other than the pre-eminently businesslike Jenatzy, the darling "Red Devil" of his German supporters, who all along took it for granted that the tawny-bearded, grim-visaged, Belgian who won the cup for them in Ireland last year would as a matter of course carry everything before him a second time. The possibility of his sustaining a defeat never entered their minds, which is scarcely surprising in view of the fact that the man has practically lived on the course since earliest spring. Not an inch of it is unfamiliar to him, yet as twilight fell on the very eve of the race we saw him starting off to make the circuit over again. Three times a day has been his average for a matter of nearly a couple of months past. In contrast to this method of trying to compel success, it may be mentioned that Salleron drove up to the headquarters of the Deutscher Automobile Club at the Kurhaus during a heavy downpour of rain on the Tuesday afternoon, and in our presence asked to be supplied with a driver's map of the course, so that he might acquaint himself with the route!







1. The enclosed portion of the street where the weighing-in took place.

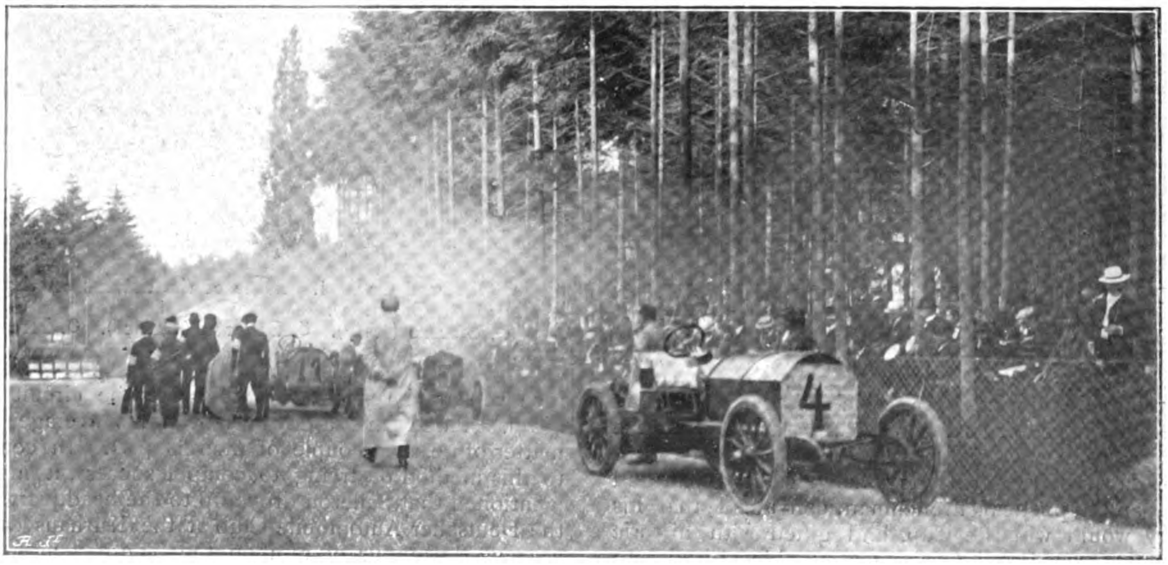
2. Sidney Girling on his Wolseley at the weighing, the day before the Race.

3. Salleron on his Mors Car, waiting his turn on the weighbridge.

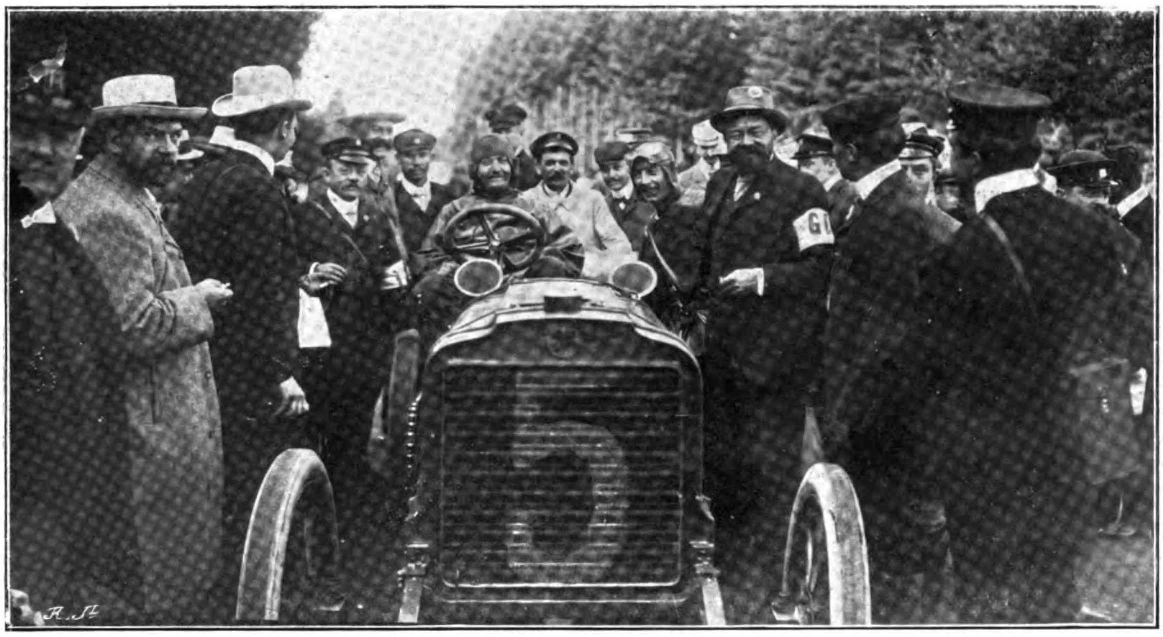
GORDON-BENNETT RACE IN GERMANY.—Weighing-in.

At 5.33, Jenatzy arrived ready for the fray, on the crest of the hill opposite the Grand Stand, and soon the officials commenced to put in an appearance. One enthusiastic lady had already taken her seat in the middle of the Grand Stand at 8 minutes to 6, from which position she surveyed the scene in solitary grandeur. Her appearance heralded one of the comic episodes of the day. The course opposite the Grand Stand was thronged by photographers and members of the Press, doubtless anxious to observe and obtain snapshots of the Emperor as he appeared in his box on the Grand Stand. The police officials, probably apprised of his approach, immediately commenced to chase the photographers and other intruders off the course to the huge delight of those who had secured seats on the stand itself, or other coigns of vantage from which they could not be dislodged, or who, by an artful arrangement of badges and a stolid demeanour, overawed the police and officials into letting them alone. "The misfortunes of our friends are the source of our sincerest satisfaction," so everyone enjoyed seeing other people ejected from the course.

With military punctuality, the Emperor arrived on the scene at a quarter past six (not, as stated generally in the Press, at a quarter to seven). He had ridden up by the Rothlaufweg, and was in the red uniform of a general of Hussars. He came forward to his seat on the stand, and was greeted by the cheers and wild waving



GORDON-BENNETT RACE IN GERMANY.—It was here that the Cars waited their turn at the Saalburg for starting. No. 4, Lancia (Fiat); No. 5, Thery (Richard-Brasier); and No. 11, Storero (Fiat) Cars waiting their call.



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GORDON-BENNETT RACE IN GERMANY.—Thery, the winner of the Gordon-Bennett Cup, on his Richard-Brasier Car, the moment before being started.

1. Baron von Molitor, Official Starter. 2. Mr. T. H. Woollen, one of the Official Timekeepers on behalf of the A.C.G.B.I. 3. M. Brasier, the designer of the winning car. 4. Thery at the steering wheel. 5. M. Michelin, of the Michelin Tyre Company.

of hats and handkerchiefs which his appearance at any public function invariably evokes.

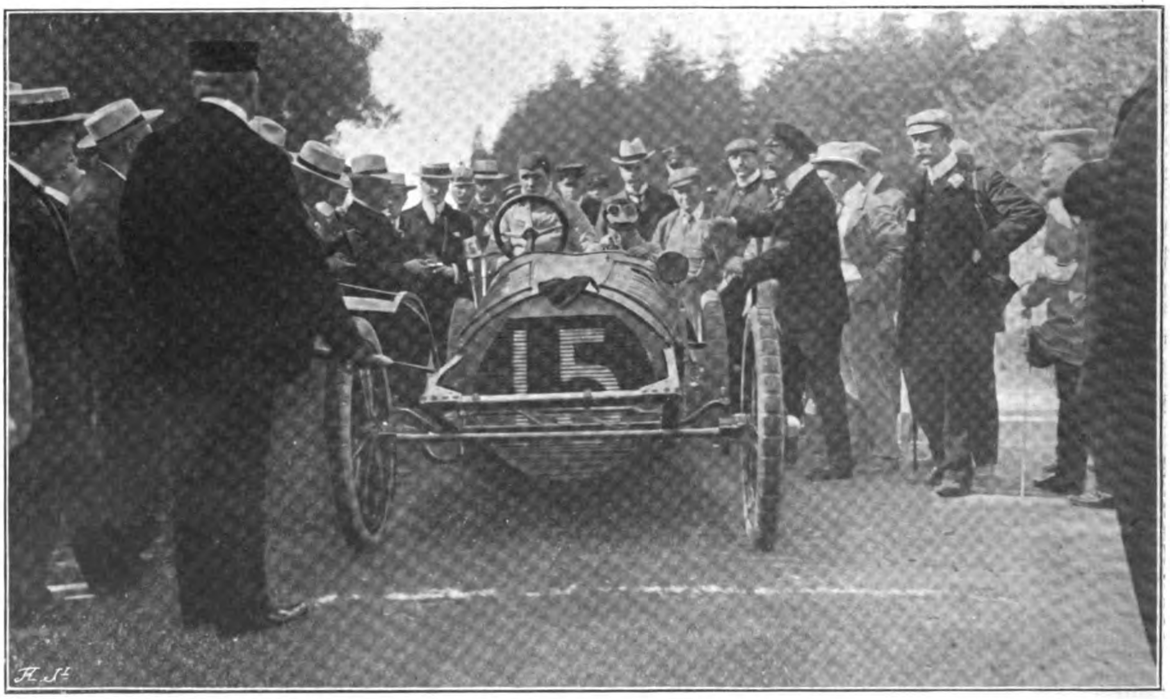
At 6.37 Jarrott drove up from Usingen on the Wolseley No. 15 to take up his place for starting, and eleven minutes later Girling sped by. At 10 minutes to 7 the Empress, who had driven up to the grand stand, appeared and joined the Emperor in the front of the Imperial box. At three minutes to the hour, one of the English reserves (H. Austin, on the Wolseley No. 20) came up to the starting-post, and then Jenatzy, the winner of last year's race and holder of the Cup, got ready to start. He shot off up the rise to the Saalburg at high speed, cheered on by a fanfare of trumpets, a form of encouragement provided for each one of the competitors, every start being announced by the same martial blare. As he sped past the Emperor's box, he raised his hand to the salute. At seven minutes past the hour Edge was off, speeding up the incline with

GORDON-BENNETT RACE IN GERMANY.—Jenatzy (No. 1) on his Mercedes Car waiting for the word to go. Jenatzy obtained second place in the Race.

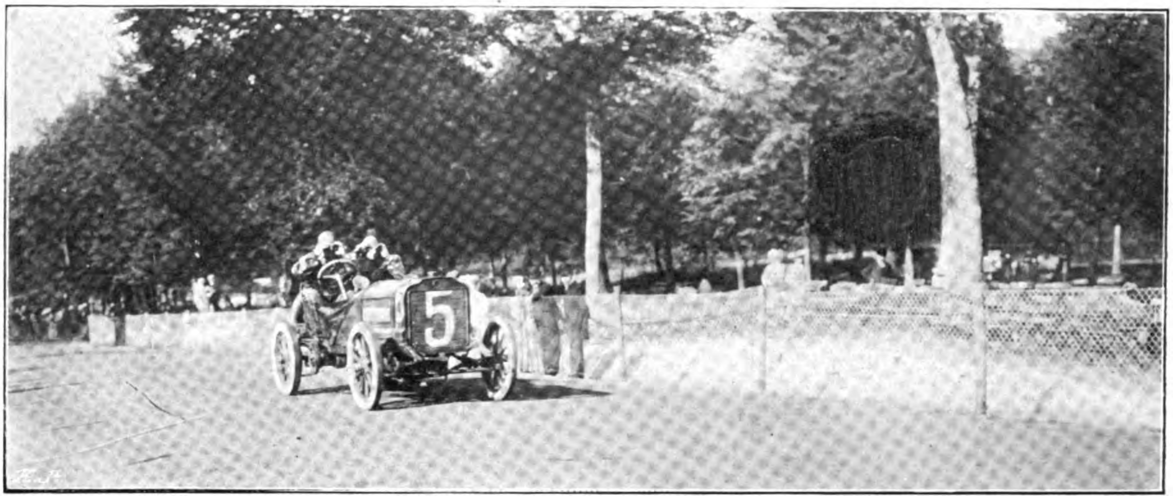
GORDON-BENNETT RACE IN GERMANY.—Lancia, one of the drivers of the Fiat Cars, at the starting line.

splendid acceleration. The third started was Werner, on an Austrian Mercedes, and a few minutes after he went by the first strains of the military band engaged to enliven the periods of waiting for the occupants of the grand stand, came borne upon as much of the breeze as had not completely died away, for it was now growing hotter and hotter, so much so that a temporary awning had to be improvised for the benefit of the Imperial party.

At 7.23 Lancia got under way on his Fiat car, giving a good impression of his driving as he passed. Soon after this the spectators on the grand stand found themselves



GORDON-BENNETT RACE IN GERMANY.—Charles Jarrott on his Wolseley Car waiting to start.



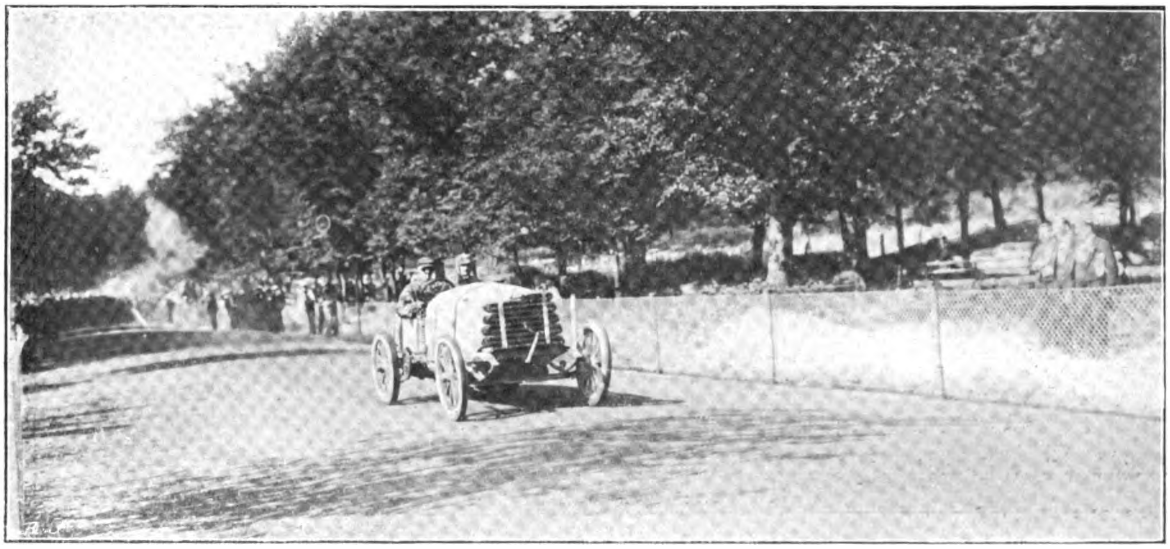
GORDON-BENNETT RACE IN GERMANY.—Thery speeding towards the Grand Stand.

taken in rear by a second military band, which struck up as the first one stopped to rest, and thus the two played alternately throughout the day. When, however, a racer passed, a dramatic pause was made, and the car was permitted to sweep by to the accompaniment of its own "music." As each of the cars came round their approach was heralded by trumpets—a very good arrangement, as it gave the spectators time to get into position. But of this more anon.

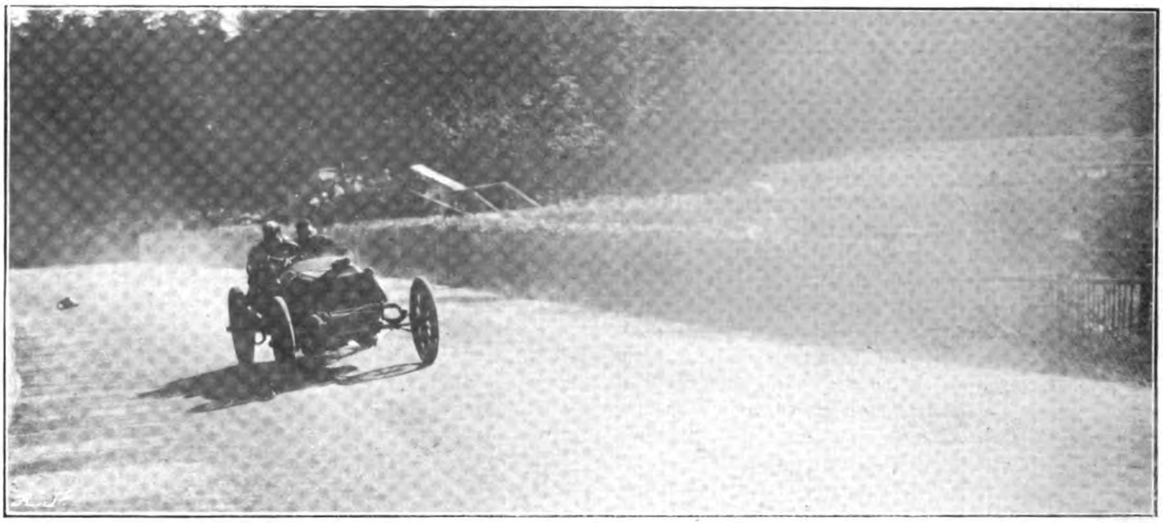
Théry was off at 7.29, and received an encouraging cheer from his countrymen as he passed the grand stand, for his performance in the Ardennes had been a splendid one, and the highest hopes were entertained of his success; and then after him De Crawhez at 7.37. He accelerated splendidly, and, passing the grand stand, was going at a very high pace indeed, and then came a mysterious interval, in which everyone was wondering, and nobody exactly knew what was happening.

Prince Henry of Prussia is, as everybody knows, an ardent motorist, and he took almost a greater interest in the proceedings than the Emperor himself. He was not in uniform, having driven up on his car, and at first took his place beside the Emperor in the Imperial box. Soon, however, he was down on the course itself, now at the starting point, the most interested of the privileged little throng surrounding each car at the start, and now taking up position opposite the Emperor's box, and carefully noting the time each car occupied in covering the 200 metres from the starting point. He was observed to be frequently sending extracts from his notes up for the benefit of his Imperial brother.

Those who have followed the information we have previously given in regard to the race will bear in mind that the cars were started some 200 metres below the Saalburg, at which point the race finished. This plan had been adopted in order that the spectators on the grand stand might enjoy the spectacle of the cars rushing past at maximum speed. The effect, however, was somewhat marred by the upward incline, as the cars did not reach their full pace till after the top of the rise had been passed, or, in other words, until the grand stand was left behind. By carefully noting the time at which each competitor started, and comparing the times at which they passed the Imperial box, a sort of rough idea of their relative



GORDON-BENNETT RACE IN GERMANY.—Rougier, a second or two after his "send-off."



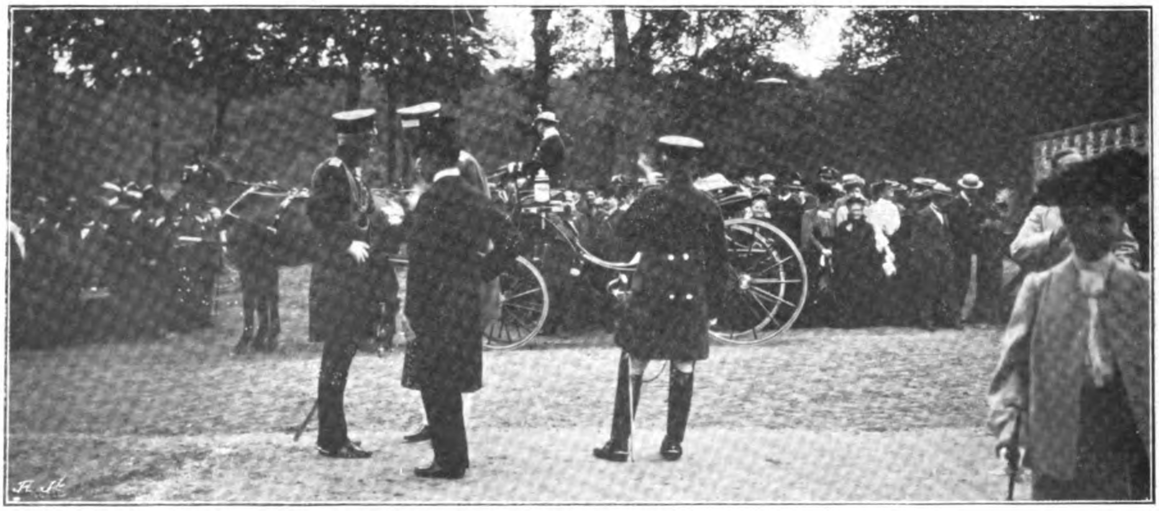
GORDON-BENNETT RACE IN GERMANY.—Sidney Girling at full speed on his Wolseley Car.

capabilities might be formed, and this was probably why Prince Henry found the course itself more congenial than the stand. The Emperor, too, was not content with witnessing the race only from that one coign of vantage. In the middle of the day he went back to Homburg for lunch, previously visiting one of the controls at Wehrheim, and fortunately we are able to reproduce a snapshot of His Imperial Majesty, taken as he was marching off at the head of his suite in that direction through the woods. It will be observed that he is stepping out well.

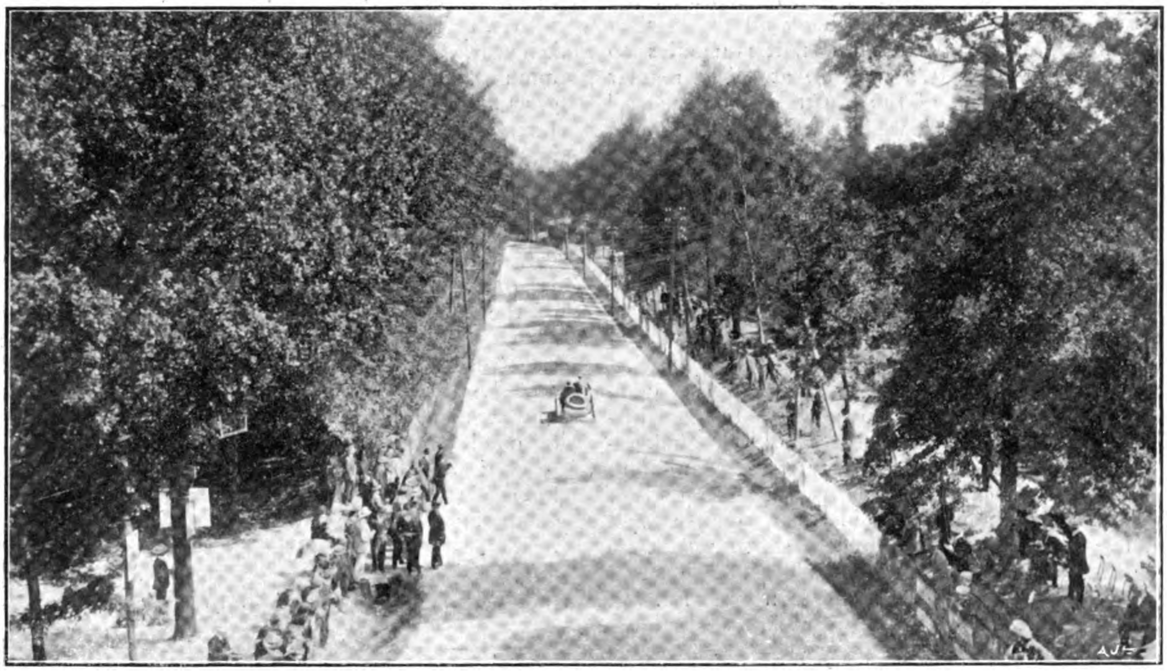
As originally arranged, the Swiss car should have been the next competitor in the field, but an accident happened to the steering gear the day before the race, just as the car was proceeding to the weighing depôt, and so Dufaux was out of the running. It is alleged that Switzerland's single champion was the victim of foul play, that the steering tube had been filed through to the thinness of a wafer. It was at least as well for the plucky driver that the actual fracture occurred before, and not in, the race, but we trust the allegation will prove to be unfounded, otherwise it would be a most dastardly occurrence, and one likely to seriously discredit automobile racing in the eyes of the public.

All this time the spectators were wondering what had become of De Caters—the favourite of everybody, for his chivalrous conduct last year, his genial presence, and his great skill as a driver. But he came not. Instead, at a few seconds after 7.49, it was Girling, on a Wolseley—the first English car—loudly cheered by his countrymen, who swept by. He was followed at 7.58 by Braun, on the Austrian Mercedes, No. 10, going as hard as he could tear. Then appeared De Caters, but a few seconds behind.

It was not till subsequently that the cause of De Caters' delay was ascertained. He had come up at the right moment to the starting point, but on starting his engine only two cylinders were found to work. Somewhat flushed and excited, the holder of the world's kilometre record was off his seat in a minute, and with

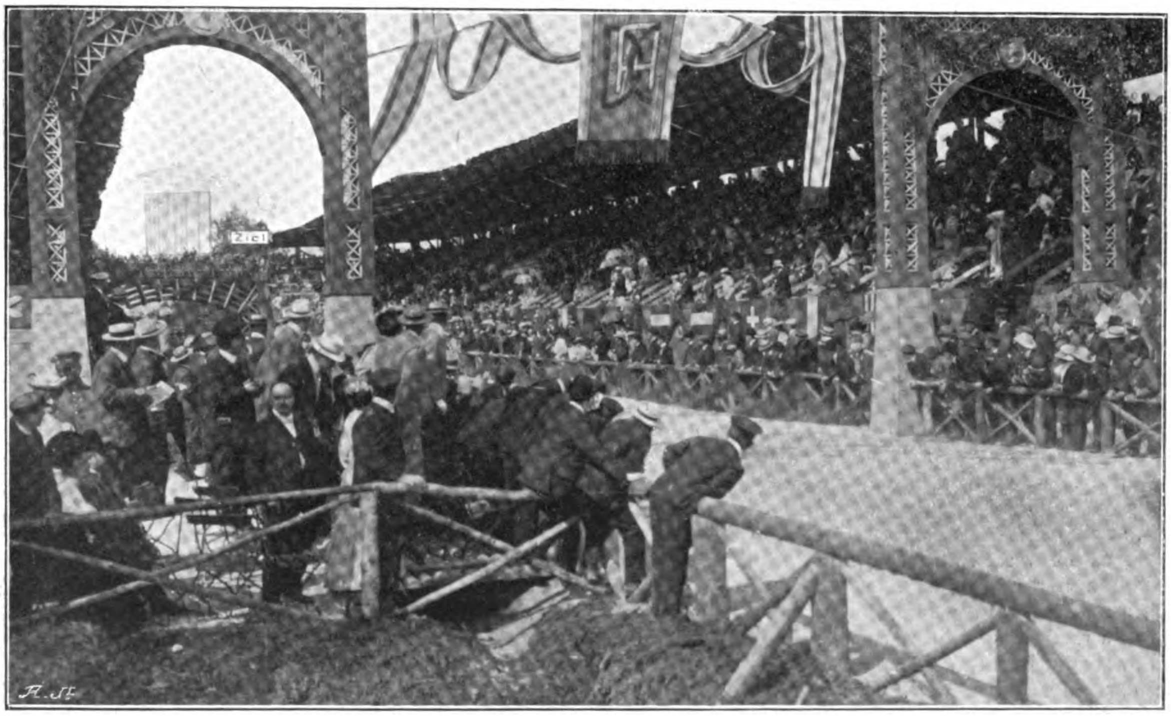


GORDON-BENNETT RACE IN GERMANY.—The suite of the Emperor of Germany waiting for the Emperor outside the "Roman Camp."



GORDON-BENNETT RACE IN GERMANY.—The view from the bridge at the lower end of the Grand Stand. Werner is seen descending the hill towards Wehrheim.

marvellous rapidity extracted the sparking plugs from the two faulty cylinders and inserted new ones. Fourteen and a half minutes, however, were lost by this delay, the *contretemps* exciting the sympathy both of De Caters' old and tried friends, Rene de Knyff, and Prince Henry of Prussia, who happened at the moment to be present at the starting point. Oil on the sparking points was understood to be the cause of the trouble. Storero on a "Fiat," Salleron on his "Mors," and Augieres on a "Pipe," now got off at intervals, and then came Fritz Opel on the Opel-Darracq, vomiting forth dense clouds of smoke, and diffusing a similar odour to that which visitors to the Isle of Man Eliminating Trial will probably come to associate in their minds with this type of racing car. After him, came Jarrott on the second "Wolseley" No. 15, off at

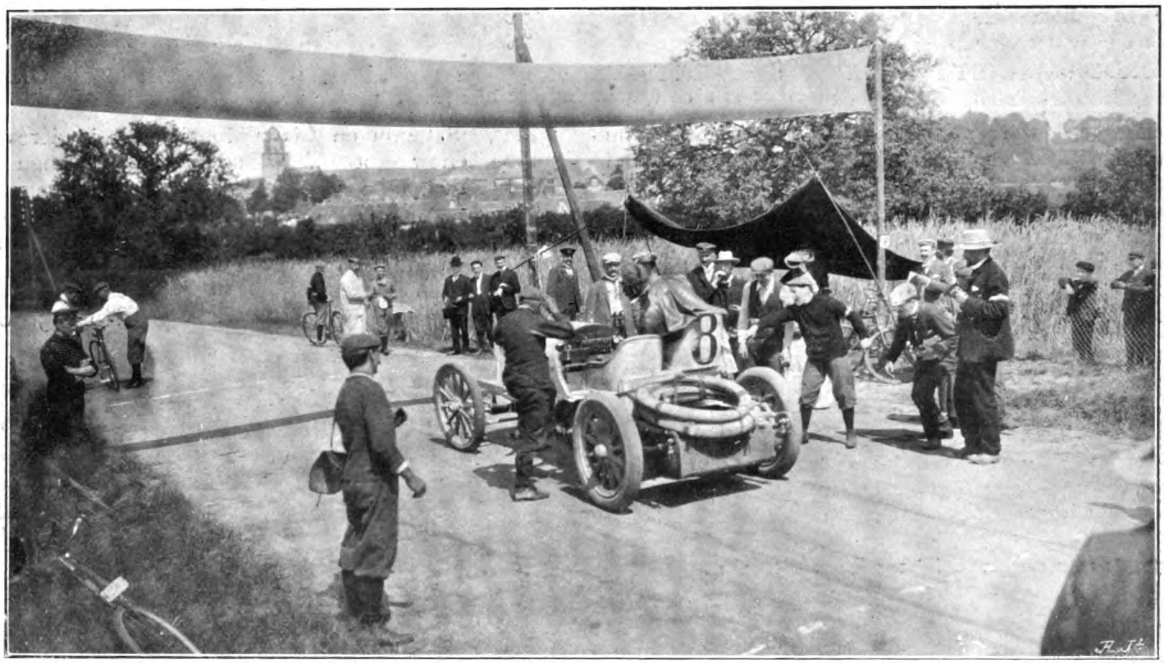


GORDON-BENNETT RACE IN GERMANY.—The Grand Stand as seen from the end nearest the starting point. The finishing line is exactly where the placard "Ziel" is seen through the left-hand archway. Just beyond, against the sky, is seen the marking board on which the results were announced.

8.32, and going with a splendid stride as he passed the Grand Stand, being loudly cheered by all the English visitors, with whom his personality is, it is needless to say, extremely popular. After him, at fairly regular intervals, came the last of the Austrian "Mercedes," driven by Warden, going well, the last "Fiat" car, steered by Cagno, not doing well, Rougier driving the Turcat-Méry, and Hautvast driving the Belgian "Pipe," the pace of which was not impressive.

Thus all the competitors were now away on the first round with the exception of the unfortunate Swiss car, which did not run, and there was an interregnum in the excitement. The more enthusiastic employed it to calculate out, from the times that had been taken between the starting point and the grand stand, or, from what other data they could get, at what time the first competitor could possibly get round again to the starting-point. It was not till 9.24, an interval of nearly half-an-hour, that a great shout, to trumpet accompaniment, proclaimed that a car was approaching the end of the first circuit. The timekeepers, of course, had utilised the interval to move from the starting point up to the goal, opposite the Emperor's box. The actual signal to start for each car had been given by Baron von Molitor. A word might be said about the manner in which this duty was carried out. Of course it is one requiring the utmost precision, and is, above all, one that requires previous practice. Unfortunately, Baron von Molitor gave no evidence of having had any. It was difficult, at times, for the drivers to tell when he started the cars, as he waved the flag about in a quite irresponsible manner, and even the timekeepers appeared to be at a loss to know when they should begin taking time. In a race of such importance, it would, perhaps, be well to secure in future an experienced starter.

The car ahead, heralded, was, as was anticipated, Jenatzy's Mercedes, which within a few moments swept past the grand stand, completing the first round in splendid style, calling to mind the magnificent driving with which Jenatzy so impressed everybody in Ireland last year. He was followed, at an interval of about twelve minutes, by Edge, who was travelling well and who was greeted by the enthusiastic plaudits of his countrymen. Excitement now ran high for rumours began to trickle in, to the effect that Fritz Opel had retired and De Caters was again *en panne*. There was consequently a considerable interval before the next car appeared, and as it shot past its number showed it to be the Richard-Brazier driven by Théry, and when the times went up, on the board surmounting the bridge connecting the two sides of the grand stand, the enthusiasm of the Frenchmen surpassed that of the Germans, for Théry was but one second behind Jenatzy's time. Both Werner and Lancia appeared to have dropped out of place, but at 10.10 Werner turned up looking in the best of condition, though the time registered against him showed that he was far behind Jenatzy; Lancia followed quickly afterward. After him, came Girling going very well on the small Wolseley. Three minutes behind, came De Caters, whose time, however, was several minutes inferior to that of Girling on this round. It transpired that Théry had been kept 30 secs. less than he should have been in the Oberhausen Control. This appeared to spectators to give him a superiority which he did not at that time possess, but the result, of course, made no difference in the actual race. At a quarter to twelve Salleron, on the big Mors, followed later by Braun, came by, and the first Italian Fiat car, driven by Storero, followed, though it took 28 mins. longer for the circuit than the best time recorded. De Crawhez, the next to pass, literally toddled past the Grand Stand. He was driving as if he was out for a day's touring, and apparently quite indifferent to the race, its results, or any other mundane affairs, as he did not appear to hurry himself in the least. Jarrott then passed within 3 mins. of De Crawhez, going in grand style, but unfortunately



GORDON-BENNETT RACE IN GERMANY.—Usingen Control. Baron de Caters waiting his turn to start from the outward control.

27 mins. to the bad as compared with the best time made. Augiere, nearly half an hour after Jarrott, and followed by Hautvast and Rougier at intervals of 5 and 13 mins. respectively, brought up the tail of the hunt, and the first round was concluded.

It was at this stage that an incident took place that almost resulted in a shocking accident to Jenatzy. When running down to the level crossing at Wehrheim, he was fortunately induced to slow up by the shouts of the spectators lining the road in front of him. Reducing his pace, he became aware that a locomotive was standing in the very centre of the level crossing. Fortunately, both Jenatzy, himself, and the locomotive driver thoroughly kept their heads. Jenatzy slowed his car still further, and the locomotive driver put his engine in motion and got out of the way. But the plucky driver of the German car lost at least a minute and probably more owing to this delay, while it is scarcely possible that his nerves could altogether have escaped unshaken, and his subsequent driving may have been prejudicially affected in consequence. The presence of the locomotive at this point must have been the result of extraordinary mismanagement or stupidity. As all the other arrangements of the race were so well planned and admirably carried out, the incident requires at least a satisfactory explanation.

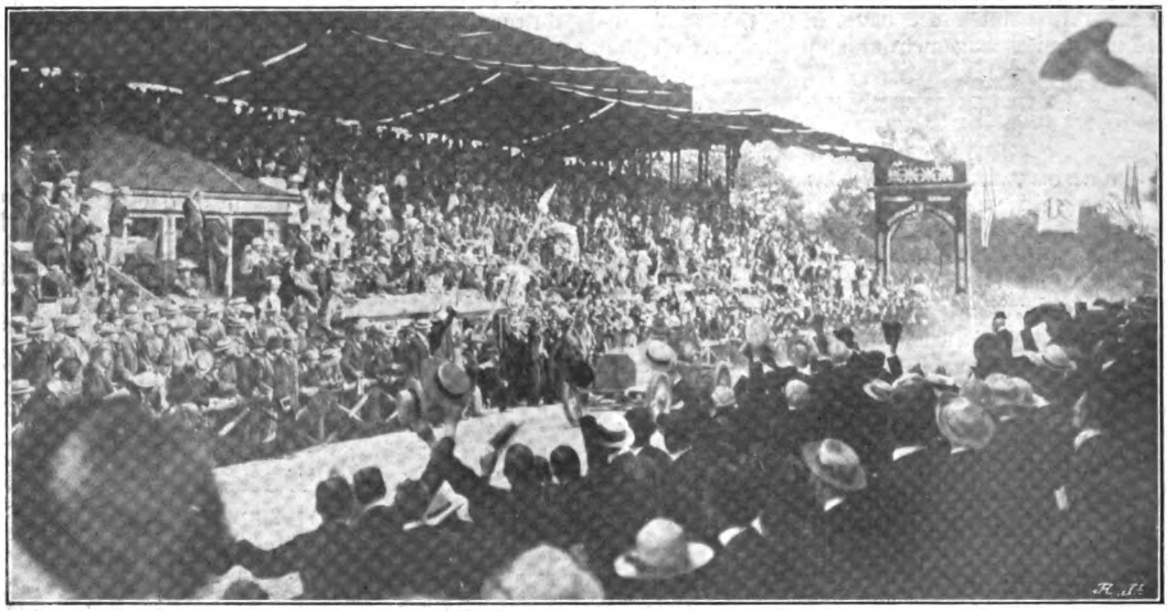
GORDON-BENNETT RACE IN GERMANY.—S. F. Edge passing through the Homburg Control on his Napier Racer.

The second round provided one of the exciting moments of the race—at any rate, as seen from the grand stand. The leading competitors had come round, Jenatzy leading as before, and all still in the running excepting Rougier. Jenatzy's arrival was at ten minutes to twelve, Théry's at a quarter past, and he was cheered more enthusiastically than ever by his countrymen; Girling was travelling well, followed closely by Lancia, Jarrott shortly preceded by Werner, finishing at a few minutes to one. At eight minutes past the hour, two cars were seen approaching apparently neck and neck. Really one was a dozen yards behind the other, but not more. At top speed they swept up the Saalburg rise, the rearmost car slowly creeping up, and, as they whirled by, it was seen that the first driver was De Caters, with Edge almost hanging on to his rear wheels. It was the first and only bit of real racing witnessed during the day, and the effect on the assembled spectators in the grand stand was electrical. The excitement was intense. Hats, sticks, and handkerchiefs were waved wildly, and the more enthusiastic members of the assembly jumped on the seats and shouted. Then came a short wait before Braun at 1.22, Storero at 1.33, Salleron at 1.45, Cagno at 2.5, and De Crawhez at 2.15, each completed their second laps.

By this time, the heat had become oppressive. Most people had lunched, and the combined effects of heat and luncheon on the Teutonic temperament resulted in many of the spectators on and around the grand stand seeking repose in the quaintest, though not always the most picturesque, postures and positions. The enthusiasts, however, had no long respite, for at 2.22 Jenatzy had finished his third circuit, and was entering already on his final lap, though Hautvast was left over as a derelict from the previous round, which he did not finish up till some minutes after Jenatzy had started on his final tour.

2.27 saw Rougier finishing his second round; he was destined to be classed fourth in the race, and his apparently bad position was only due to the time he started; nevertheless, the position he ultimately attained came as a surprise to a good many. Hautvast and Warden also ended their second rounds a few minutes later, at 2.22 and 2.34 respectively, and after that Warden dropped out of the race. At 2.39, Théry commenced his fourth and final circuit, then there was a long wait of nearly an hour, ended at 3.34 by Lancia on the first "Fiat" car, which was travelling better than on the previous rounds, commencing his final lap. He was followed in two minutes by De Caters, and finally, only four minutes later, Edge commenced the final round. He was going in splendid style, and up to this point his times had been good, so that still there was hope of his winning, and his failure to appear again proved the severer disappointment.

As the time drew near when Jenatzy might be expected to finish the race, the excitement grew intense. The Emperor was back in his box. Every seat was packed, and every eye straining down the road towards the point at which the cars were expected to appear from the direction of the Homburg control. The excitement became so great that the crowd was almost unruly, and the officials had the greatest difficulty in restraining them. At this—the psychological moment—a telephone message was received that Jenatzy was passing through the Homburg control, and was preparing to approach the winning post. There was a wait. More excitement. A car appeared in the distance. "He comes!" "It is he!" "He has won!" "Deutschland, Deutschland uber alles!" The car approaches at high speed. It is not Jenatzy at all! It is Cagno, on a Fiat car, calmly finishing up the third round. However, he passes on, and, after another false alarm, at 4.47 the real Jenatzy arrives, passes the winning post amidst the stentorian "Hochs" of "United Germany," stops and returns. And now is the thrilling moment of the race. Théry was known on the last round to have time in hand, and should he come in within twenty minutes, he will win. Germany will be beaten by France. But a race is never lost till it is won. Something may happen. Axles or crank-shafts break, a tyre be punctured. It is on the knees of the Gods. The minutes pass. Again there is a shout. A car is approaching. Its number is made out. It is Théry on the Richard-Brasier. And then the Frenchmen shouted, laughed, and in the exuberance of their delight, almost fell over each other. And some of them entoned the Marseillaise. The Emperor, with kingly generosity, at once turned and congratulated Baron de Zuylen for the A.C. de France. And then burst forth from the gratified Frenchmen, witnessing the Emperor's act, a shout of "Vive l'Empereur"—a sound that has not been heard on German soil for almost a hundred years.



GORDON-BENNETT RACE IN GERMANY.—Jenatzy finishing in front of the Imperial Box. He was started first and finished first, but Thery was winner by about 11 minutes.

Other representatives of the French club, called to the Royal box to be received by the Emperor, were Count Chasseloup Laubat, Ch. René de Knyff, M. M. Dumont-pallier, Henri Menier, and Huillier. Finally, M. Brasier was commanded to approach, so that Emperor William could personally congratulate him upon the great victory achieved. In our frontispiece, this exact and happy moment is pictorially shown.

The Emperor followed up his generous recognition of the French victory by immediately dispatching a warmly-worded telegram of congratulation to President Loubet, to which President Loubet immediately returned an equally appropriate reply.

After their somewhat unrestrained exhibition of feeling, the French contingent recognised the claims of appetite, and, with cries of "*en buffet*," made a spirited charge in the direction of the refreshment room.

Interest now began to flag, and the grand stand gradually emptied as some of the remaining competitors finished off, coming in in the following order:—Lancia, Werner, Braun, Girling, Salleron, Rougier. The arrival of Girling, at any rate, removed some of the depression from which most of the English visitors had been suffering. Up to now, no English competitor had finished the race. His arrival, at any rate, showed that one, at least, of the British competitors had got home. The fourth round was not finished by all the competitors, but Hautvast, Cagno, and Jarrott came in before the race was finally declared over.

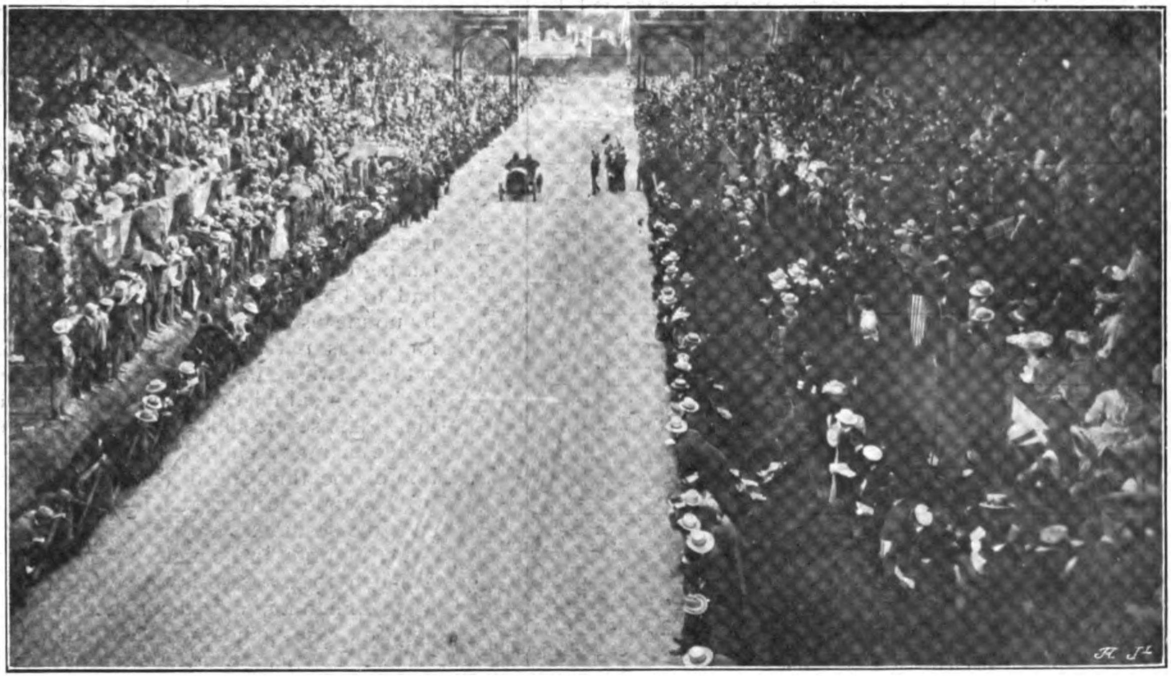
At a quarter to eight, while racing cars were still coming round, an outburst of general indignation was occasioned by Herr Fritz Opel appearing on the course, towing back his disabled Darracq car with another machine, the wrong way round. He was stopped by a leading official of the Automobile Club, who expressed himself very impressively as to such a dangerous and unjustifiable violation of all rules.

Previous to the day of the race, there had been considerable rain. It was probably of benefit to everyone concerned, for though the Westrumite, with which, at a cost of £2,500, the German Automobile Club had generously treated the whole course, proved most effective, there would have been dust from some of the by-roads to add to the unpleasantness occasioned by the extremely oppressive nature of the day. It was the oppression which frequently precedes a thunderstorm, and a thunderstorm was coming. The spectators had hardly left the neighbourhood of the Saalburg, and the other parts of the course, when the fringe of a great storm was seen approaching. It may be that the monarch (or wood-god) of the Taunus mountains was displeased at the invasion of his domain by the thunder of the racing cars. At any rate, he provided a magnificent display of the "non imitabile fulmen" of his own. The Taunus thunderstorms are celebrated, and as the weary visitors were retiring from the revels with which the day of the race concluded, one of the most magnificent thunderstorms imaginable played over Homburg, the lightning being practically continuous and the rain falling in sheets. It cleared off before eleven the next morning, and the rain rather benefited the tourists who made the circuit of the course on the following day.

In general, the arrangements in connection with the race were admirable, excellently carried out, and resulted in the avoidance of the slightest accident either to competitors or the general public, although, as we have pointed out, the incident of Jenatzy and the locomotive is one that demands inquiry. There is one exception, however. Adequate arrangements had not been made or the convenience or accommodation of the timekeepers—M. Tampier of the French Automobile Club, assisted by Messrs. Woollen and Swindley. The German club seemed to think that they ought not in any way to interfere with their proceedings, but this non-interference policy produced most painful results for the gentlemen in question. They were all acting in an honorary capacity, but the box provided for them was so inadequate that Mr. Woollen had to spend the whole of the day outside it, with no accommodation for his books, papers, or watch. They were, of course, unable to leave their posts from the time the race started to the time it finished, yet no arrangements were made for providing them with the refreshment that they so sorely needed, and, though one of the representatives of this Journal drew the attention of an official of the German Club to the circumstance, the gentleman in question merely shrugged his shoulders, and explained it was none of his business. Our representative accordingly, being anxious that the value of the race should not be spoiled by the premature demise of the timekeepers from inanition, succeeded in procuring some refreshment for some of them himself, and thus, in all probability, averted what would have been a painfully tragic episode in an otherwise altogether successful event.

The elaborate arrangements for reporting the race from different parts of the course by wireless telegraphy and by telephone, proved rather conspicuous failures. The wireless telegraphy installation refused to work altogether, and all the telephones went out of order except the single one connecting the Homburg control with the grand stand. These troubles, particularly the telephone disturbance, may of course have been due to the fact that an electric storm was silently, though not the less effectively, "raging" the whole day of the race.

Provisions for the refreshment of the Wolseley cars and their drivers, at the Usingen Control, had been undertaken by Mr. W. C. White and Mr. Frederic Coleman, of the White Steam Car Company. They had carried out their arrangements on the most elaborate scale, and the organisation was perfect, the cars as they arrived being seen to, provided with water and all other requirements, while anything the drivers needed was on hand as if by magic. With commendable public spirit, the representatives of the Dunlop Company also joined in. On one occasion, as he passed, Mr. Jarrott's radiator and tyres needed cooling. Mr. White and Mr. Coleman had amply attended to it, but another enthusiastic



GORDON-BENNETT RACE IN GERMANY.—The winner, Thery, at the moment of finishing the Race. His car is passing over the winning line immediately in front of the Royal Box.

RESULT OF THE GORDON-BENNETT RACE, 1904. PARTICULARS OF THE COMPETING CARS, THEIR NET RUNNING TIMES AND SPEEDS, &c.

Place.	Official number.	Driver.	Description of car.	Tyres.	Weight of car.	Country.	Actual hour of start. A.M.	Net times. 1st lap.	Net times. 2nd lap.	Net times. 3rd lap.	Net times. 4th lap.	Net times. Official total.	Net times. Average per lap.	Approximate speed.
					kilogs		h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	m.p.h.
1	5	Théry	80-h.p. G.-R.-Brazier	Michelin	988	France	7 28 2	1 26 57⅘	1 26 45⅘	1 29 56⅗	1 26 22⅕	5 50 3	1 27 30⅘	53
2	1	Jenatzy	90-h.p. Mercedes	Continental	999	Germany	7 0 0	1 26 56⅘	1 28 31⅗	1 37 46⅖	1 28 13⅘	6 1 28⅗	1 30 22⅕	51·5
3	8	De Caters	90-h.p. Mercedes	Continental	1001	Germany	7 42 1⅘	1 43 15⅕	1 39 36⅖	1 33 31⅖	1 41 6⅘	6 46 31⅖	1 41 37⅘	45·5
4	18	Rougier	100-h.p. Turcat-Mery	Michelin	1000	France	8 52 2	2 6 24⅕	1 37 0	1 30 53	1 33 54	6 47 11⅕	1 41 47⅘	45·5
5	10	Braun	90-h.p. Mercedes	Continental	1001	Austria	7 56 1⅘	1 56 24⅗	1 41 38⅘	1 38 29	1 43 15⅖	6 59 49⅕	1 44 57⅕	44
6	19	Hautvast	60-h.p. Pipe	Continental	994	Belgium	8 51 1⅗	1 46 46⅗	1 44 23⅘	1 51 26	1 39 58⅗	7 2 36⅗	1 45 39	44
7	12	Salleron	100-h.p. Mors	Michelin	1001	France	8 10 1⅘	1 36 57⅕	2 3 46	1 53 50⅖	1 40 40⅕	7 15 15⅗	1 48 48⅘	42·5
8	4	Lancia	65-h.p. Fiat	Michelin	1005	Italy	7 21 1⅘	1 54 53	1 42 13⅖	1 48 27⅕	1 52 18	7 17 54⅕	1 49 28⅗	42·5
9	9	S. Girling	72-h.p. Wolseley	Dunlop	995	England	7 49 1⅘	1 32 54⅘	1 34 25⅗	2 15 54⅗	1 59 38⅕	7 22 54⅕	1 50 43⅗	42
10	17	Cagno	65-h.p. Fiat	Michelin	1005	Italy	8 45 2⅕	1 42 23⅘	1 44 19⅕	1 43 30⅘	2 13 20⅗	7 23 36⅗	1 50 54⅕	42
11	3	Werner	90-h.p. Mercedes	Continental	998	Austria	7 14 1⅕	1 58 41⅕	1 52 47⅗	1 53 56⅗	1 46 47⅘	7 32 15⅗	1 53 3⅘	41
12	15	C. Jarrott	96-h.p. Wolseley	Dunlop	992	England	8 31 1⅗	1 35 18	1 57 32⅗	2 0 20⅕	2 3 39⅘	7 36 52	1 54 13	40·5
	2	S. F. Edge	80-h.p. Napier	Dunlop	988	England	7 7 2⅕	1 31 44	2 36 8	1 37 41⅗	—	—	—	—
	6	De Crawhez	60-h.p. Pipe	Continental	1001	Belgium	7 35 2	2 28 32⅕	2 16 37⅖	2 21 52⅕	—	—	—	—
	11	Storero	65-h.p. Fiat	Michelin	1006	Italy	8 3 1⅘	1 54 56⅗	1 43 5	—	—	—	—	—
	16	Warden	90-h.p. Mercedes	Continental	1007	Austria	8 38 1⅗	2 7 14⅖	1 57 17⅕	—	—	—	—	—
	13	Augieres	60-h.p. Pipe	Continental	1002	Belgium	8 17 1⅘	2 23 7⅕	—	—	—	—	—	—
	14	Opel	80-h.p. Darracq	Continental	1005	Germany	8 24 4⅗	—	—	—	—	—	—	—
	7	Dufaux	90-h.p. Dufaux	—	—	Switzerland	—	—	—	—	—	—	—	—

NOTE.—The total time for the four laps as given in the above table is that officially declared. The net times per lap are unofficial. The approximate speeds are based on a total distance of 309 miles actually travelled out of control. This is obtained by deducting the lengths of the controls (33 miles) from the over all length of the course as published in the official guide (342 miles).

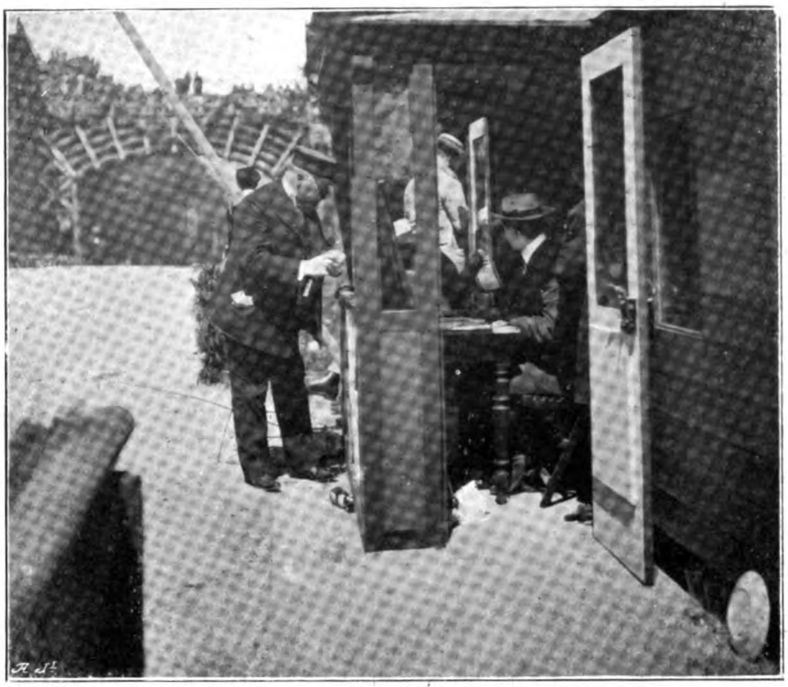
admirer, as Mr. Jarrott was starting, thinking that he had not had enough water, threw an extra bucket over the car. Some of it may have cooled the radiator, but the greater portion of it descended on Mr. Jarrott and Bianchi. However, it was an excessively hot day, and perhaps the effect was not disagreeable.

Some Causes of Delay.

Although it is impossible for us to give anything like a complete report concerning the cause of the breakdowns, or the partial disarrangements, which were experienced by each car, yet the following information concerning the three English competitors is interesting, and will enable the nature of the difficulties experienced in such a race as this to be understood, besides showing the extraordinary strains to which such fast racing cars are subjected on a course of this kind.

Mr. Jarrott's experiences are, perhaps, the most entertaining, for he certainly was racing during a great part of the time under extremely adverse conditions. Starting off by making a splendid run to Limburg, a bit of rough road was soon encountered, and here the side-chain on the near side broke, smashing a steel guard in half, and hitting his mechanician, Bianchi, on the arm. The chain shot up into the air, and completely disappeared. Soon after, the chain having been replaced, the governor—which, by the way, is an innovation on Wolseley cars of any kind—broke down, and jammed the throttle valve full open; driving then became difficult, since it was necessary for Bianchi to operate the switch, cutting off the ignition, whenever the engine had to be slowed down. It was, therefore, by no means a simple matter to change speed, for it was not always possible for Bianchi, with his switch, to act in perfect unison with Jarrott's manipulation of the clutch and gearing. The severe shocks imposed on the gear by the engine 'racing,' led to the utter demolition of the third-speed gearing, so that even by this time Jarrott was in a by no means enviable position.

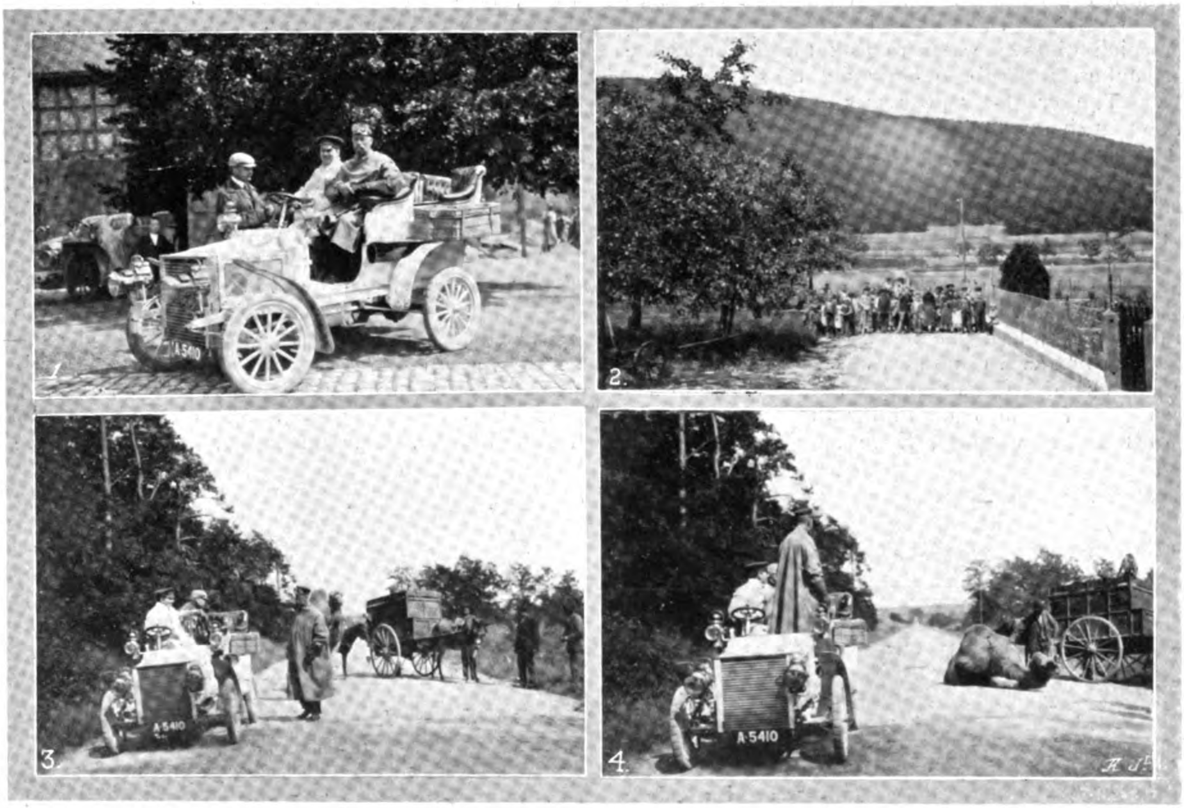
During the third circuit, a stop was made at Usingen to try and improve matters somewhat, and an improvised connection was made between the hand-lever and the throttle-valve. This, however, soon proved useless, and, to make matters worse, the necessary pressure ceased to be maintained on the petrol; Jarrott, therefore, had to work the hand-pump, Bianchi being still busy with the switch. As a crowning trial, the radiator opened up during the last round, and, in spite of all attempts to patch it up, required refilling at every control. Water, too, was thrown over the radiator as the car passed by, but, as already said, the two occupants, too, soon became wet through. Arriving at Limburg, three cylinders only were working, and this state of things continued even after a broken wire had been discovered and duly fixed to the commutator. It was, however, decided not to stop, since, with only three cylinders, three speeds, a burst radiator, no governor, and the awkward "switch-control," the car was really travelling splendidly, and continued to do so under these conditions for some time. But suddenly, for no apparent reason, when leaving Homburg, their luck appeared to change, although only too near the end of the race. The fourth cylinder began to work properly again, the governor commenced to do its duty, and, except for the radiator and the third gear, the car could apparently have run another round at record speed, for Mr. Jarrott said the engine was working magnificently.



GORDON-BENNETT RACE IN GERMANY.—The Timekeepers' "tribune." On the left is seen the end of the Grand Stand, where the bridge was erected over the course.

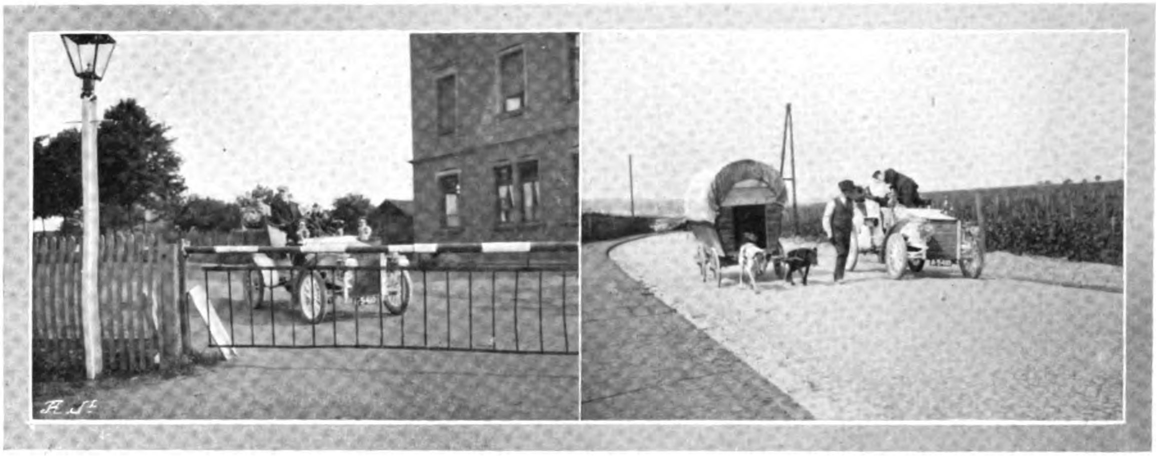
No trouble whatever was experienced with the Dunlop tyres, which seemed, at the end of the race, to be in absolutely perfect condition.

The other Wolseley car had distinctly ill-luck also, although it ran so exceedingly well, and, in spite of having the smallest engine, did the third best average speed during the first two laps — which may be taken to represent the time prior to any trouble commencing. Girling had a bad time of it, owing to some dirt having lodged



Photos. by Mr. C. Frederic Coleman.

GORDON-BENNETT RACE IN GERMANY.—Prince Henry of Prussia had a delightful experience on the course, and in the neighbourhood, on a "White" Steam Car, which had been driven over to the Taunus by Mr. W. C. White, accompanied by Mr. Winsor T. White, the President of the White Company, Mr. Frederic Coleman, and Mr. Ellison Armour, of Chicago. During the run, the party met a travelling Italian circus on the way back to Schloss Wolfsgarten, the hunting lodge of the Grand Duke of Hesse. Prince Henry stopped to see the effect of the car upon the animals (3), and witnessed a camel, a monkey, and other members of the "company" go through some unrehearsed performances (4), subsequently "commanding" the proprietor to perform at Wolfsgarten. In our top picture (1), Prince Henry is seated to the left of Mr. W. C. White, and a crowd of villagers are seen in the next picture (2), who were waiting the passing of the Prince at Hochst.



One of the railway level-crossing gates. A 2-dog-power vehicle.

GORDON-BENNETT RACE IN GERMANY.—Some typical scenes on the road during the tour to the Saalburg on the "White" Car. (Photographs by Mr. Frederic Coleman.)

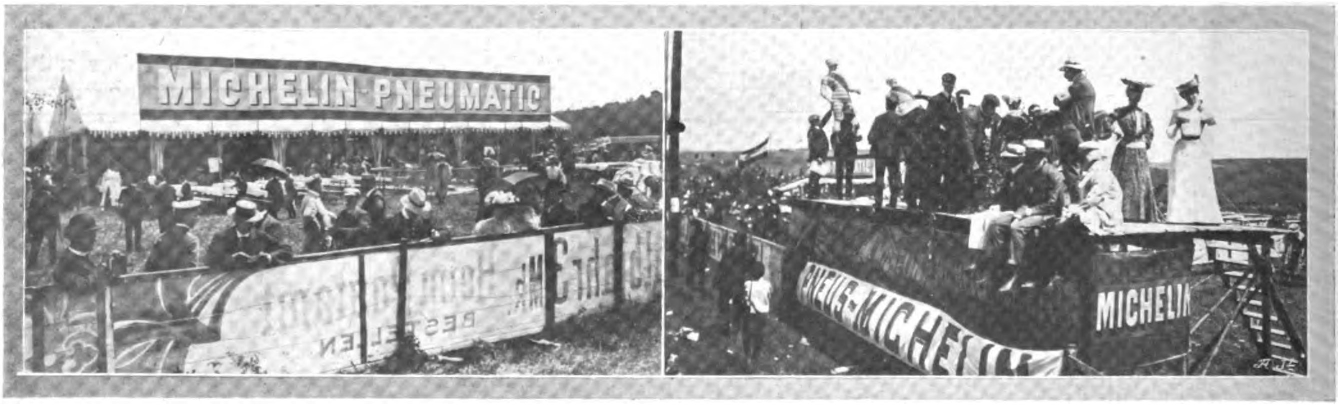
in the carburettor, and to his having failed to detect this simple cause of the trouble. The obstruction occurred between the float chamber and the nipple. Some delay, too, was caused by a broken petrol pipe, but on this car, as on that driven by Jarrott, the Dunlop tyres gave no trouble whatever.

The first difficulty met with by Edge, on his 4-cylinder Napier, which was unlucky enough the week before to break its crank-shaft, was caused by strained cylinder-liners, which allowed water to leak through into the crank-chamber, and subsequently led to serious overheating. The crank-chamber was practically full of water, so that the moving parts were running in it, and the lubrication was spoilt, as the water ejected the oil. During the second round, a delay of 14 minutes occurred at Limburg through the commutator chain coming off. This apparently arose from the spring which holds the jockey-pulley having broken, and unfortunately the half-speed-shaft was bent by the chain jamming against it. Even when the chain was replaced, the bent shaft led to the same thing happening again 10 miles further on, so that a further 21 minutes was spent in fitting a new tight chain. Considering all things, it speaks volumes both for the car and for the driver, that, in spite of these happenings, Edge should have made fourth best speed during the third lap, which took only about 6 minutes longer to complete than on the first round, when he was third fastest.

After running another ten miles, and when nearing Neuhof, one of the tyres punctured, but, expecting to be able to obtain assistance with it at Neuhof, he drove on to that town. No tyre man, however, could be found there, so he had to settle down and repair it himself. Except for this one puncture, and for pumping twice, his "Dunlops" behaved splendidly.

On the last round, one of the bearings on the intermediate shaft fired—curiously enough the only phosphor bronze bearing on the car—so that he had to stop at Wehrheim, at which town the car arrived firing a truly terrifying volley of cannon shots from the exhaust, the intensity of which surpassed, so Mr. Edge tells us, anything that even he had heard from any protesting vehicle.

Although we have been able to give these very full details with regard to the English team, yet it must not be supposed—and, in fact, a glance at our table of results sufficiently shows the absurdity of doing so—that all the foreign competing vehicles came off any better. It is obviously much more difficult for us to obtain full particulars regarding them, but amongst some of the troubles which came under our observation are the



The Stand at Wehrheim. The Special Stand erected at Bibendum by the Michelin Company.

GORDON-BENNETT CUP RACE IN GERMANY.

PREVIOUS RESULTS OF THE GORDON-BENNETT RACE.

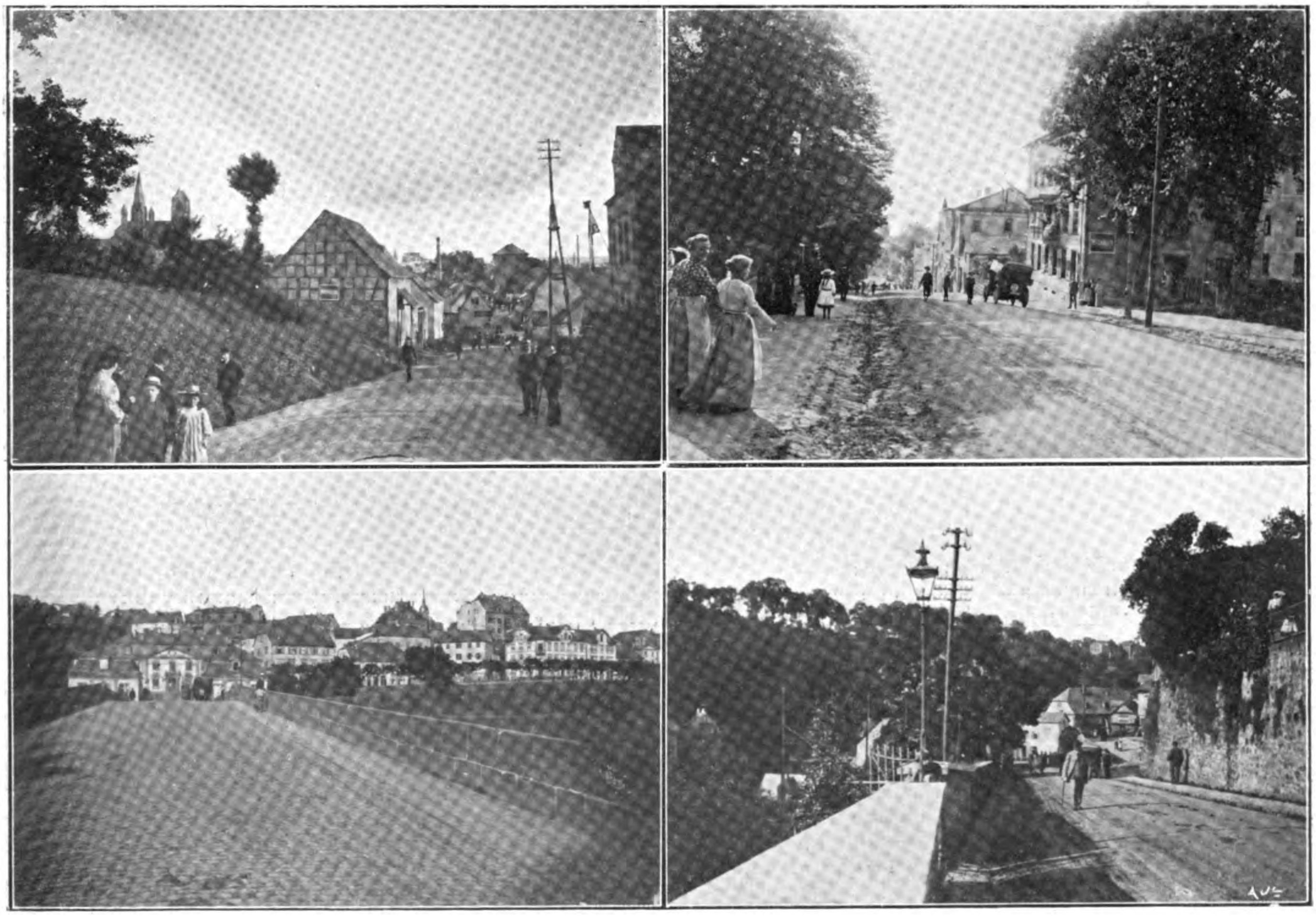
Year.	Winner.	Country.	Car.	Tyres.	Course.	Average Speed.
						m.p.h.
1900	Charron...	France ...	20-h.p. Panhard	Michelin	Paris-Lyons ...	38·5
1901	Girardot	France ...	40-h.p. Panhard	Michelin	Paris-Bordeaux	40
1902	Edge ...	England	40-h.p. Napier ...	Dunlop ...	Paris-Innsbruck	34
1903	Jenatzy ...	Germany	60-h.p. Mercédès	Continental	Ireland (circular course)	49·5
1904	Théry ...	France ...	80-h.p. G. Richard-Brazier	Michelin	Taunus (circular course)	53

The Cup, presented to the A.C. de France by Mr. James Gordon-Bennett in 1899, is annually competed for over a course of not less than 550 kiloms. (344 miles) nor more than 650 kiloms. (416 miles), and each country may send not more than three representatives.

following: Lancia, on his "Fiat" car, and Braun, on his Austrian "Mercedes," were both delayed by punctures, the latter being stopped for 14 minutes at one spot. Werner apparently lost time through not being satisfied with the effectiveness of the brakes on his Austrian "Mercedes," De Crawhez experienced trouble with the ignition on his "Pipe," and Salleron was stopped for 23 minutes in fitting new links to one of his chains. It is significant, too, in view of the performance of the other "Darracq" cars, both in England and in France, that the Opel-Darracq should have been compelled to retire so early in the race with a broken cardan joint.

Whilst dealing with these technical aspects of the race, it is only right to draw special attention to the excellent showing which was again made by Michelin tyres, for not only was this make of tyre fitted to the winning car, and to all those forming the winners of the "Team Cup," the French cars, but the Italian racers also were shod with "Michelins."

The advocates of side chains, as against the live axle type of transmission gear, will not fail to have noticed that although those famous manufacturers, Panhard-Levassor, for the first time forsook previous practice and went over into the enemy's camp on this matter, yet all three of the successful cars in the French eliminating race were chain driven, and the three first cars in the great race itself also had side chains.



1. Entrance to Idstein. 2. Entrance to Weilburg. 3. The Bridge at Weilburg. 4. A descent at Weilburg.

GORDON-BENNETT RACE IN GERMANY.—Some views on the road.

A big gathering of Englishmen had gone over to Homburg to witness the race, amongst those who were present, or to whom "G.B." placards had been issued were:

The Countess of Londesborough, the Duke of Buccleuch, Sir Edgar Boehm, Sir Thomas G. Freake, Col. Holden (the chairman of the A.C.G.B.I.) and Mrs. Holden, the Marquis of Northampton, Sir David Salomans, Bart., Major Lindsay Lloyd, Capt. John Spicer, Colonel Drummond, Messrs. H. Austin, F. A. Bird, C. Barrett, Paul Brodtmann, F. Burdett, H. B. Money Coutts, S. F. Calthorpe, C. T. Clifford, O. B. Cole, Frederic Coleman, J. C. Collingwood, H. D. Corey, P. Dawson, Alfred Du Cros, Arthur Du Cros, C. G. Davis, M. Egerton, M. Epstein, C. L. Freeston, J. O. Fairfax, J. Farmiloe, E. H. Fletcher, C. J. Glidden, J. Gorham, W. Giesler, W. Gibbons, E. B. Hopps, J. Hargreaves, Ballin Hinde, J. H. Johnson, S. Jones, O. Joseph, E. Kenealy, E. Kennard, S. H. V. Kerr, F. Lawson, E. S. Lehwess, W. M. Letts, R. H. Lucy, J. J. Mann, E. Manville Martin, E. J. Morant, G. H. Morrell, junr., J. Ochs, J. W. Orde, E. A. Philippi, W. F. Pretty, Lionel de Rothschild, F. Rendle, D. N. Ritchie, E. L. Roberts, Stanley Spooner, H. T. Shaw, F. J, Sharpe, L. Schleutheim, H. J. Swindley, H. C. Smith, H. J. Smith, S. Straker, P. M. Stewart, J. Thomson Smith, S. Somerset, M. J. Tuchman, Roger W. Wallace, K.C., Claude Watney, W. G. Wilson, W. C. White, W. H. Woollen, W. J. Wright, Winsor T. White.

Saturday, the day following the race, the programme was for the tourist cars to travel round the course. The start, however, was delayed owing to the fearful storm which had raged throughout the night, and which did not cease until about 11 o'clock on the Saturday morning, when the sun ventured forth and tempted a considerable number to undertake the round. Those who started were duly rewarded, as the day subsequently turned out exquisitely fine, and all those who had arranged to attend the official dinner in the evening at the Kurhaus were back in ample time for the reception at this function. Théry's toast was naturally one of the features of the evening, to which his reply, consisting only of a few words, bore the impress of genuine appreciation of the compliments paid to him.

The grounds of the Kurhaus were specially illuminated, and a magnificent display of fireworks had been arranged as part of the evening's amusement. Special trains were run from Frankfort and other principal points, and return midnight trains had also been put on by the companies, so that altogether a vast crowd had been brought together to take part in the fun provided.

Several meetings of the International Congress were held during the week, and a final one took place on Monday last in the morning, which was adjourned until the afternoon. The main question for discussion, beyond the queries connected with the Cup Race, was the proposed alteration of the Cup Race rules raised by the British club. Unfortunately, this could be only informally discussed, as, in the interval between the morning and the afternoon meeting, several of the official representatives had been compelled to leave Homburg, notably the French delegates. In a measure, the German club representatives agreed with the view put forward by the British club, but as no definite suggestions or practical propositions could be actually brought before the Conference, it is understood the whole question was postponed. The proposals to modify the Race rules will probably be brought forward in a formal manner at the meeting of the International Conference in December, when doubtless a definite programme will be presented, so that the contest in 1906 may be organised on the new lines or similar ones to those put forward by the British club. It would be impossible to make any serious alteration in the 1905 rules if something is not decided before December, as by that time the majority of those who propose to take part in next year's race, would either have actually built their cars, or their plans would be in such a forward state that it would be impossible for them to prepare fresh designs to meet any new regulations that might be decided upon. French motoring opinion appeared to be distinctly against any modification, and already the French club men are putting forward mountainous Auvergne as the likely spot which may be selected for the 1905 course.

The following table shows the relative order of the countries competing as judged by the performances of their respective teams. The marks are obtained by adding together the "places" of the competitors representing each country taking part in the race. The team obtaining the best places consequently receives least marks; the minimum marks possible for a team of three being 6, which would be obtained by its individual cars getting 1st, 2nd and 3rd places respectively (1st + 2nd + 3rd = 6). All competitors not finishing the race are considered as coming in last together, that is, they are each debited with having the 19th place:—

France	...	1st + 4th + 7th = 12	marks
Germany	...	2nd + 3rd + 19th = 24	,,
Austria	...	5th + 11th + 19th = 35	,,
Italy	...	8th + 10th + 19th = 37	,,
England	...	9th + 12th + 19th = 40	,,
Belgium	...	6th + 19th + 19th = 44	,,

That Sir Hiram Maxim's flying machine merry-go-round is a huge financial success was apparent from the figures mentioned by the chairman of the company, Sir Hiram S. Maxim, at the statutory meeting of the company, held on Monday last. An idea may be formed of the takings of the company from the fact that on Saturday last 10,000 paying passengers were carried on the two machines at present in operation, viz., one at the Crystal Palace and the other at Earl's Court Exhibition. The two machines have cost about £12,000, and Sir Hiram anticipates getting a profit of 150 per cent. on the Earl's Court machine, and from 40 to 50 per cent. on the Crystal Palace machine. Something approximating to 92,000 persons have already paid at the turnstiles at Earl's Court. It is hardly surprising, therefore, to learn that similar machines are to be erected at Blackpool and Southport at the earliest possible date.

Some people do not like the cheerful toot of the motor car horn. Nevertheless, it is a statutory duty on every driver when approaching vehicles or even pedestrians to give "audible and sufficient warning of the approach of his car" by tootling on his horn. If he does not do this, he is liable to be fined, and a case occurred at Guildford recently, in which a motorist's number was taken by the police, and he subsequently summoned for this offence. On the whole, therefore, it is better for him to incur a little extra popular hostility by hooting too much, than to involve himself in the chances of being convicted before magistrates for hooting too little. At the same time, the case to which we refer, is a crying example of what we said might happen under the recent Act, viz., that the numbers of cars would be taken, and their drivers summoned, without informing them at the time of what offence they would be accused.

THE "HALL" HYDRAULIC VARIABLE SPEED-GEAR.—Part I.

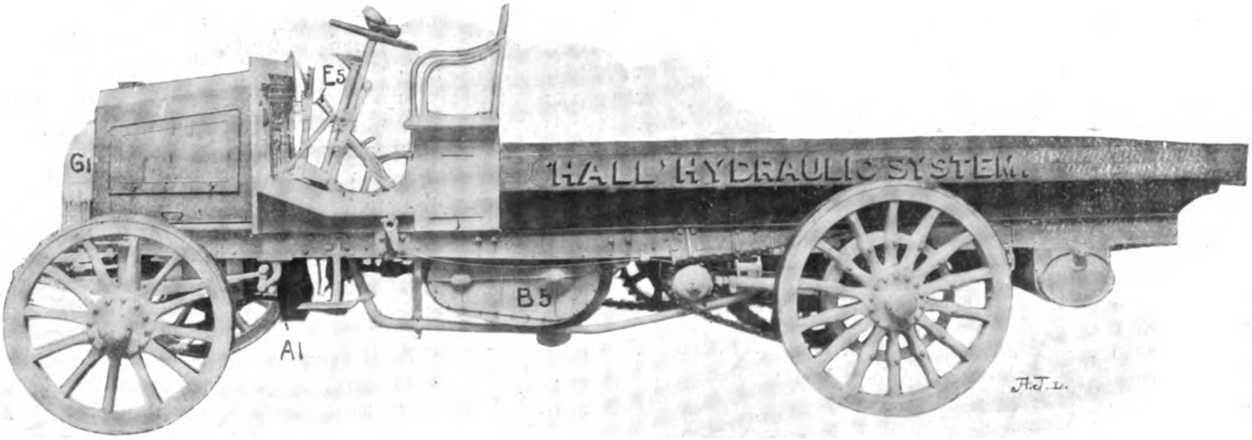


Fig. 1.—A 2½-ton "Hall" Petrol Lurry, fitted with Hydraulic Variable Speed-Gear.

In previous articles describing the comparatively few other forms of true variable gears that have been brought up to a commercial state of development by their inventors, we have already dwelt very fully on the practical advantages that such a mechanism possesses (over an ordinary change-speed-gear) for petrol-driven cars, and have also drawn attention to the fact that few more difficult problems have been met with by engineers than in the design of a satisfactory gear of this character. It is unnecessary, therefore, to more than briefly recall the former, and merely to re-state the latter fact, in these preliminary remarks introducing the "Hall" gear as now put on the market—a form of gear in which a hydraulic system, using oil as the fluid medium, is employed for enabling the relative speeds of the engine and of the road wheels, which it drives, to be varied *gradually*, instead of step by step as is usually done. We have also explained previously that variable speed-gears differ radically from one another, not only in the system employed to give the required effect, but also in the degree to which that effect can be obtained, and that from this point of view they may be divided into three distinct types—those in which the available range is from a maximum to a minimum speed only, those in which the range is from a maximum to zero, and those in which variations of speed can be made progressively from a maximum in the one direction to another maximum in the "reverse" direction of rotation.

The advantages of such mechanisms as these are that a less flexible engine is necessary, that the engine can always be allowed to run at its best speed—irrespective of the car-speed, that the injurious shocks imposed by changing from one fixed speed to another are avoided, and that consequently a less skilled driver is required. These features are, of course, more particularly important for vehicles of the heavier types, and for those required for commercial purposes, because it is with them that the shocks and strains of starting and of changing gear are more severe, and that economical working is especially essential.

The Hall gear, which is the invention of Mr. J. W. Hall, of Palmerston House, Old Broad Street, E.C., is by no means an untried or undeveloped mechanism, for it is now some years since the first successful gear made by him was fitted to a petrol car, and that particular car has since then run many thousand miles both as a touring

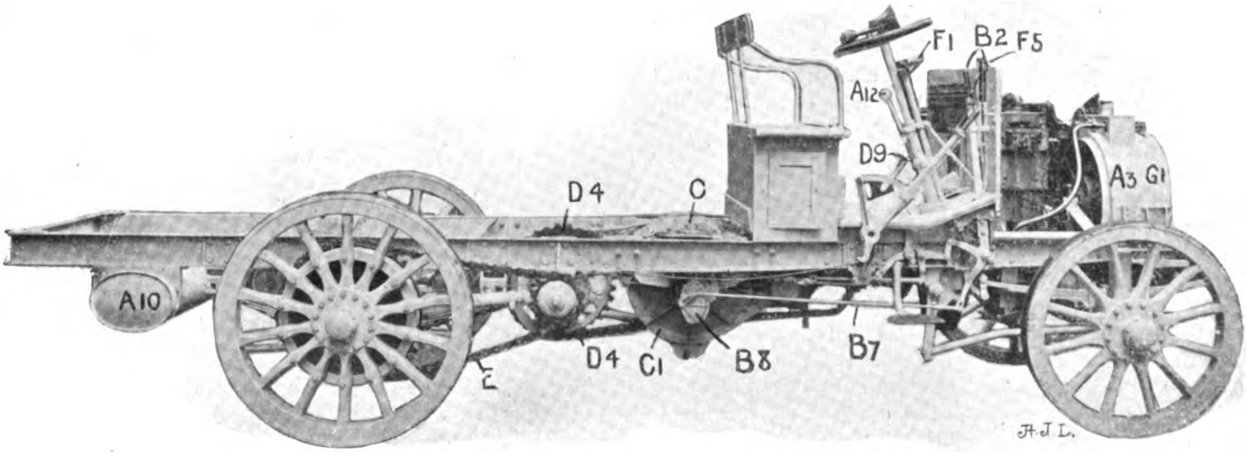


Fig. 2.—View of the "Hall" 2½-ton Lurry Chassis from the right side.

vehicle and also with a lurry platform doing commercial work. During the whole of this period, too, Mr. Hall has been busily engaged in still further perfecting and in simplifying the mechanism, and has progressed to such an extent in these directions that a very successful standard type of petrol lurry has now been put upon the market by him, and that arrangements have been concluded for turning out this and other models on a very extensive scale. Being a mechanism in which an entirely new principle for this purpose is involved, an enormous amount of experimental work has naturally had to be carried out in order to obtain the necessary data from which to design the gear in its present commercial form, and it is only those who have been personally connected with other undertakings of a similar character that can realise to the full what this means both in the way of time and of money. Even now it is quite possible that the gear will be still further improved, for Mr. Hall hopes to construct it in such a way that the range of speed obtainable with it will be from the maximum to zero, instead of only from the maximum to a minimum, as it is on the gears which he is turning out at present. It will then be possible to entirely dispense with a main clutch of any kind on the car, and not only will the usual shocks attending change of gear from one speed to another be avoided—as it is with the mechanism in the form which we are about to describe—but the even more serious strains that are now produced when starting a heavy vehicle from rest, even at the present minimum speed, will also be eliminated—an extremely important matter both in public service vehicles and in all those which carry heavy loads.

The principle upon which the "Hall" gear is based is in itself very simple, but, as with other variable-speed-gears, there are certain characteristics in the actual mechanism which are neither easy to explain briefly and lucidly, nor to understand thoroughly without some little study. For this reason we propose deferring our detailed description of the actual construction until after the general principle involved has been explained, and until the manner in which the gear is used on one of the lurries now running has been made quite clear, with the assistance of the drawings and photographs which we have prepared of that vehicle.

Stated briefly, the engine is made to drive a powerful pump which can deliver oil under pressure to a hydraulic engine, and this hydraulic engine—which is connected with the road wheels in such a way that it drives them—is so constructed that the length of stroke of its pistons can be varied by the driver. Assuming that the pump and the hydraulic engine were distinct units on the car—which is not the case in the "Hall" gear—the pump would deliver a constant supply of oil to the hydraulic engine, so long as the petrol engine continued to run at the same speed, and the pressure upon that oil would depend upon the amount of work required at the time to drive the car. The speed of the hydraulic engine, however, would vary as the stroke of its pistons was varied, because it must take the whole of the oil delivered to it and because the amount it would take *per revolution* would depend upon the length of the stroke. Not only would it run at a lower relative speed when given a longer stroke, but the mere fact of lengthening the stroke would also increase the leverage of the pistons on the crank-shaft, and consequently the turning moment on the road wheels would be greater. It will thus be seen that a true variable speed-gear would be provided by this arrangement, because reduced speeds would be accompanied by increased "torque," since the relative speed of the hydraulic engine could be gradually varied over a certain range by the driver, and the full horse-power of the engine still be taken advantage of. It should be pointed out also that the whole of the power would be transmitted from the pump to the hydraulic engine through an incompressible fluid medium, and that, therefore, the power-transmitting connection between them would be practically as inflexible as though their shafts were coupled together mechanically.

Although it is on this general principle that the "Hall" hydraulic gear is constructed yet there are many serious drawbacks that would render un-commercial a simple hydraulic system of the kind we have just indicated, and it has therefore been necessary to introduce many radical modifications. Without entering into these in detail at the moment, it may be said that the weight of the crude apparatus would be practically prohibitive, and the transmission losses, too, would be enormous. In the "Hall" gear, the pump and the hydraulic engine are combined together to form a single unit, and the mechanism is so designed that its weight is not excessive, and that its efficiency—particularly when the direct drive on top speed is in use—is very high. It is perhaps, as yet, too large and heavy for adoption in ordinary pleasure cars, and it is by no means a cheap mechanism to construct, but on the other hand it is, as we have already mentioned, far more needed for heavy work, where a little extra weight is less important, and any additional prime cost is, on such vehicles, fully compensated for in the way of additional durability.

The "Hall" petrol lurries, of which several have recently been constructed, are driven by 12-h.p. petrol engines, and are intended for carrying loads of 2½ tons. One of these complete vehicles is seen in Fig. 1, from the "near"-side, and the same vehicle with its platform removed is shown from the "off"-side, in Fig. 2. Further illustrations of it are given in Figs. 3, 4, 5, and 6, from which the general arrangement of the various parts and the manner in which the hydraulic gear is employed can be clearly gathered. Fig. 3 is a side elevation in which the off-side wheels have been removed, Fig. 4 is a plan (partly sectional), and Figs. 5 and 6 are from photographs taken of the central portion of the chassis to show the gear in position there.

The engine, A, which is of the 2-cylinder vertical type, is fixed direct to the pressed sheet-steel frame in the usual position in front. Its normal speed is 700 revs. per min., and at this speed it is capable of developing 14-b.h.p. In front of it are arranged two large circular radiators, behind which is a chain-driven fan. The front radiator (G^1) is used in connection with the variable speed-gear for cooling the oil, and through the other (A^3) is circulated the cooling water for the engine, by the pump, A^2. The engine is fitted with low-tension igniters, and there are two magnetos, A^4, one on each side of it, either of which can be brought into use. The petrol tank, A^{10}, from which the feed is by pressure derived from the exhaust, is carried across the back underneath the main-frame, and the exhaust-box, A^{11} (Fig. 6), is also fixed transversely across at the rear; sufficient petrol is usually carried to run a distance of over 100 miles. No provision is made for varying the time of ignition, but the speed of the engine is regulated by an accelerator lever, A^{12}, on the steering pillar. Between the engine, A, and the flywheel, A^1, are mounted two chain-wheels, on the crank shaft, and from these pass the

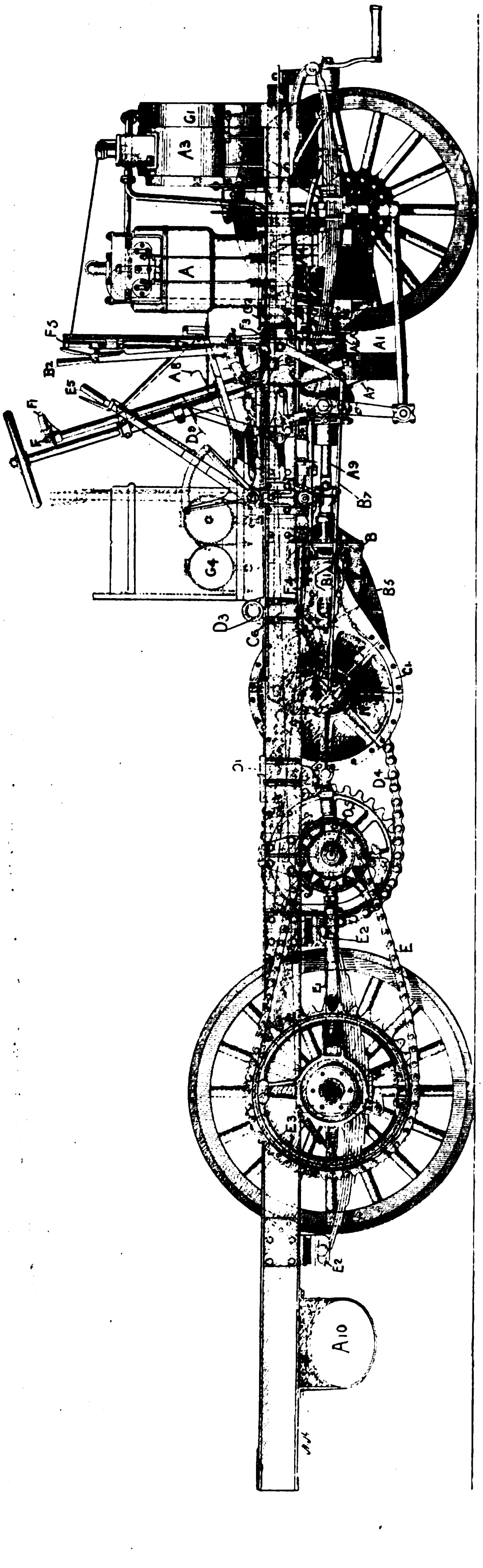


FIG. 3.—Side elevation of the "Hall" Lurry, with "off-side" wheels removed.

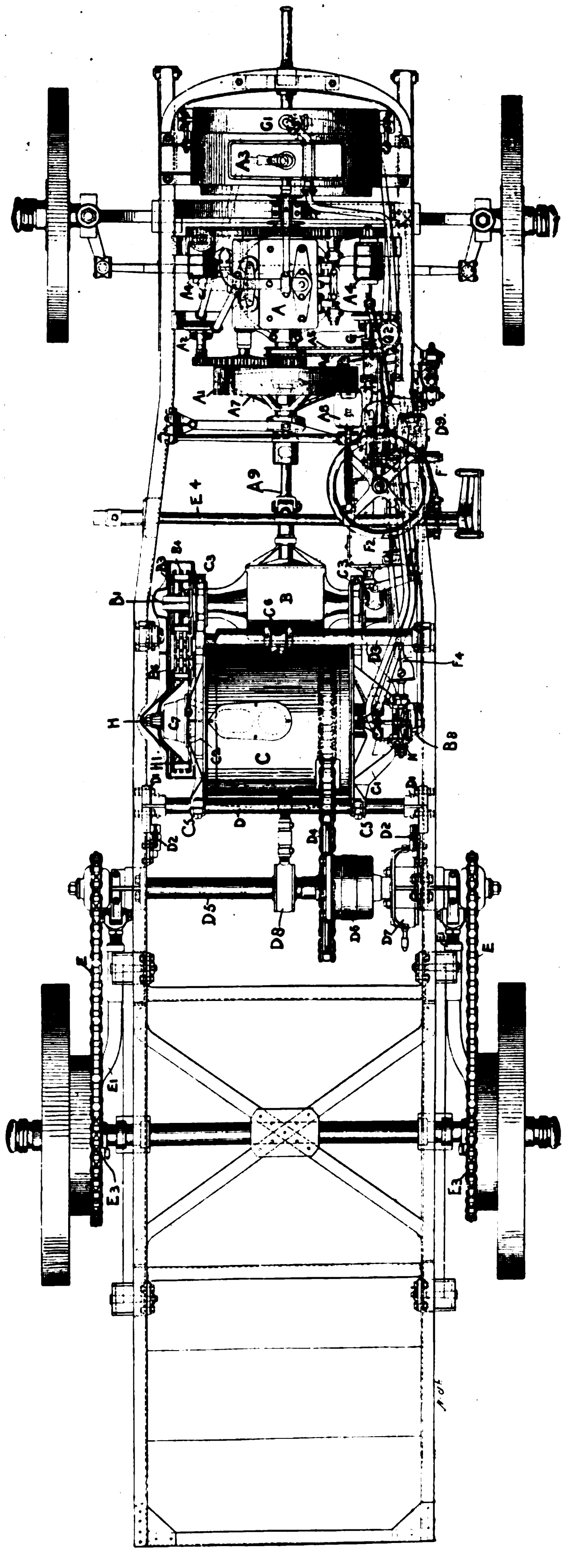


FIG. 4.—Plan (partly sectional) of the "Hall" 2½-ton Petrol Lurry.

chains, A^5 and A^6, to operate accessory portions of the gear mechanism, that will be described in due course.

The power is transmitted from the engine through a foot-operated cone-clutch, A^7, in just the usual way, the clutch being controlled by the pedal, A^8. The inner member of the clutch is connected by a short propeller-shaft, A^9—which has a universal joint at one end and a sliding flexible coupling at its front end—with a reversing-gear mechanism, contained in the oil-tight casing, B. The reversing gear consists of a transverse shaft, B^1, upon which are mounted two facing bevel wheels, either of which can be brought (by the reversing lever, B^2) into mesh with a bevel pinion on the short longitudinal shaft, to which the propeller-shaft, A^9, is coupled, so that the former shaft can be driven in either direction at will. The casing enclosing the reversing gear is so mounted that it can be moved bodily, forwards or backwards, for adjusting the tightness of a chain, B^4, that transmits the power from it to the hydraulic-gear mechanism. The chain, B^4, is of the "Renold" silent type, and the chain-wheel, B^3, over which it runs, is securely fixed to the shaft, B^1; this chain is completely enclosed in a separate casing, B^5, and it can be tightened or slackened by operating feed-screws, C^4, which press up against the casing, B, and cause it to slide in guides, C^3, that form part of the castings, C^1 and C^2.

The castings, C^1 and C^2, constitute, in conjunction with a steel drum, C, the case inside which the hydraulic variable-gear is enclosed. This casing is fixed to the chassis at three points only, so that it is self-aligning at all times. The castings, C^1 and C^2, are secured by the brackets, C^5, at the rear, to a cross-tube, D, on the main frame, and there is a universal-joint coupling, C^8, arranged centrally in front of the drum, C, by which the gear is suspended from another cross-tube, D^3, of the frame.

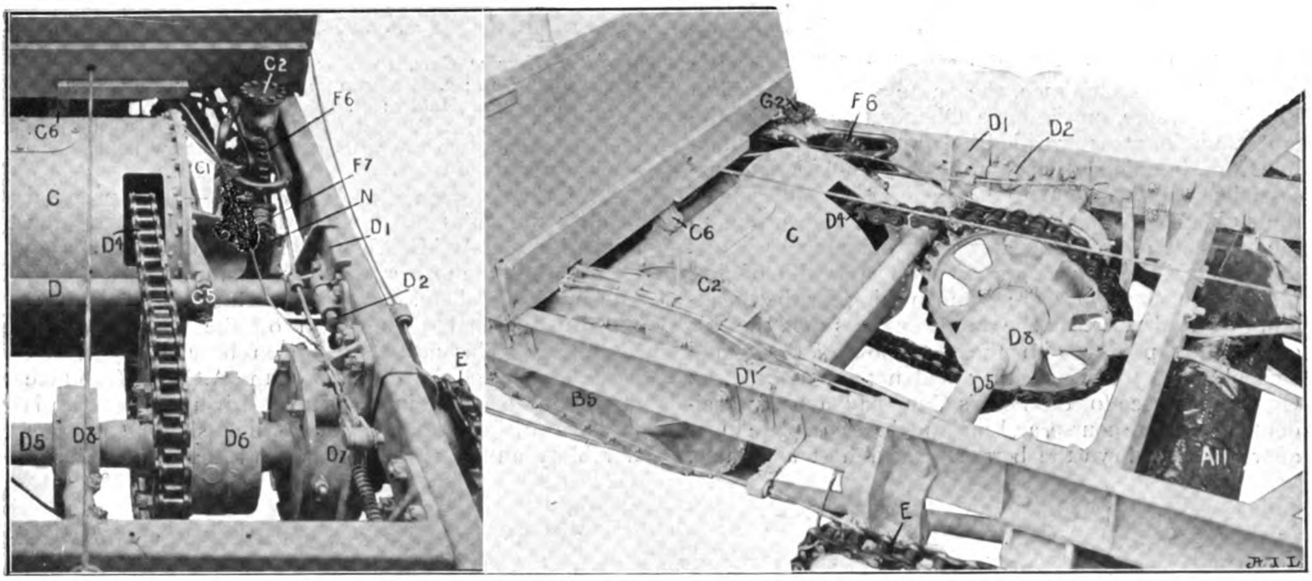
The hydraulic gear is driven by the silent chain, B^4, to which we have already referred, and the power is transmitted from the gear by the roller change, D^4, which passes out through slots in the drum, C. The silent chain, B^4, runs over a sprocket, H^1, on the shaft, H, and the gear ratio between this shaft, H, and the engine is such that it is driven at about 300 revs. per min. when the engine is running at its normal speed. The chain, D^4, connects the driving member of the variable-gear with a differential countershaft, D^5, from the ends of which the usual side-chains, E, pass to the rear road-wheels. The driving member of the change-speed-gear can be made to revolve at any speed between that of its driven shaft, H, and one-fourth this speed, so that the speed of the countershaft and, therefore, that of the road-wheels, can be varied over this range by manipulating the hydraulic gear only. The chain-wheels and sprockets are so proportioned that the car runs at *any* speed between 2-m.p.h and 8-m.p.h. when the engine speed is normal.

The tightness of the chain, D^4, can be adjusted by moving the transverse tube, D, forward or backward along the frame, of which it forms a part. This is provided for by fitting the tube with brackets, D^1, at either end so that they clip the side members of the frame, by slotting the holes through which the bolts fixing them in place pass, and by fitting tightening screws, D^2, to the side members. The tube, D, can in this way be forced along forwards or allowed to move back in the other direction, and thus the entire gear mechanism—swinging about the flexible coupling, C^6—can be shifted in the required way for adjusting the chain, D^4. It should be pointed out that the propeller-shaft, A^9, is made in such a way that it is sufficiently telescopic to allow for the adjustment both of this chain, D^4, and also of the silent chain, B^4.

The countershaft, D^5, is mounted in ball bearings at each end, and there is also another central ball bearing, D^8, which takes the pull of the chain, D^4. The differential gear, D^6, is fitted close up to the sprocket that drives it, and there is a powerful foot-operated brake, D^7, between it and the right side of the main frame; the foot-brake is operated by the pedal, D^9. Strong adjustable radius rods, E^1, are, as usual, fitted between the countershaft brackets and the back axle, and the ends of the side-springs are carried by pins riding in horizontal slots, E^2, in the spring brackets. The back axle is constructed of a substantial steel tube, and is quite straight. There are powerful internal expanding brakes, E^3, fitted to the hubs of both wheels, the brakes being operated by the hand-lever, E^5, through a compensating steel cable passing through the rocking-tube, E^4. All four springs upon which the main frame is carried are unusually long and flexible; those in front are 3 ft. 5 in. long, and those at the rear are 4 ft. long.

The hydraulic gear is controlled—and the speed of the car is normally varied—by the horizontal hand-lever, F, which is mounted near the steering pillar, and is normally held in a neutral position by a spring-operated plunger, F^1. When this lever is moved in one direction, the engine is caused to gradually increase the gear ratio of the hydraulic-gear mechanism, and this action continues so long as the lever is held in that position. Moving the lever in the other direction has an opposite effect, and there is an indicator, F^5, on the dashboard by which the driver can at any time tell approximately what the ratio is. The actual work of changing the gear-ratio is done by the engine through a relay mechanism, which lies beneath the driver's feet, and is driven by the chain, A^6, passing from the crank-shaft and running over the sprocket, F^3. The relay mechanism is contained in the casing, F^2, and from it passes a universally-jointed shaft, F^4, to the gear-changing mechanism proper. This shaft is caused to revolve slowly in one direction when the hand-lever, F, is moved forwards, and to do the same in the opposite direction when the hand-lever is drawn towards the driver.

When reversing the car, by the hand-lever, B^2, the bevel-wheels inside the casing, B, are not only caused to slide along their shaft, so that the hydraulic-gear shaft, H, is driven in the other direction, but a portion of the gear mechanism itself also requires to be operated simultaneously, as will be seen when we come to describe the construction of that mechanism. Referring to Figs. 3 and 4, it will be noticed that the reversing-lever, B^2, is connected, by a system of bell-cranks, with two distinct operating-rods, B^6 and B^7; the former of these causes the bevel-wheels in the casing, B, to slide along their shaft, and the other rod, B^7, is led to a rocking casting, B^8, which forms a portion of the hydraulic gear. The bell-cranks and their connecting levers are arranged so that the two actions take place simultaneously, and there are provisions made for taking up any wear, in either independently or in both, besides ensuring that the bevel-wheels mesh correctly with the bevel-pinion when the hand-lever, B, is either in the "ahead" or the "astern" notch on the quadrant. The reversing gear, too, is so arranged that it can only be operated when the hydraulic-gear mechanism has been brought to its lowest speed position; the same range of gear-ratio is, of course, available for travelling either forwards or backwards.



FIGS. 5 AND 6.—Views of the central portion of the "Hall" Lurry Chassis, showing the Hydraulic Gear and the Differential Countershaft in place.

The radiator, G^1, is employed for keeping cool the oil that is used (as the fluid medium) by the hydraulic gear. This oil is drawn continuously from the gear by a circulating pump, G, and is again returned to it after it has been forced through the cooler, G^1, and a filter, G^2; the pipes, G^3, leading into and from the gear are well seen in Figs. 4, 5, and 6. A supply of oil for this system—to replenish any that may escape through leakage at any point—is carried in a tank, G^4, beneath the driver's seat, but it should be clearly understood that this oil system—although incidentally it serves to lubricate the greater part of that gear mechanism—is quite distinct from the lubricating-oil system on the car. The lubricating oil is carried in another tank beneath the driver's seat, and is distributed by a multiple sight-feed, fitting on the dash, to the engine and to the various bearings. Pressure is maintained in both oil tanks, and also (as already stated) in the petrol tank.

This useful lurry has a tare weight of 2 tons 18 cwt., a platform area of about 58 sq. ft., and the actual power available on the driving wheels is about 12-b.h.p. The extreme overall dimensions are 18 ft. 6 in. and 6 ft. 6 in., length and width, respectively, the wheel base is 10 ft. 10 in., and the track is 5 ft. 4½ in. The front wheels have 3-in. steel tyres, and are 3 ft. in diameter, whilst the rear wheels are 3 ft. 6 in. in diameter, and their tyres are 4 in. wide. Although nominally intended to carry a load of 2½ tons, and to travel at speeds of up to about 10 miles per hour, yet it is capable of exceeding that speed, and has successfully undergone tests carrying loads of 3 tons under very severe working conditions.

(*To be continued.*)

MOTOR BOATING.

MME. W. K. VANDERBILT, JUN., is credited with having steered her husband's racing boat to victory at New Rochelle in America.

Kiel Motor Boat Races.—A good number of entries were received for this event, down for this week-end. The chief entries are in Class 1, for boats 18 to 25 metres long (unlimited horse-power).—500-h.p. "Zariza" (19·07 m.), and 320-h.p. "Werftbarkasse Karin" (24·7 m.).

Class 3a, for boats 8 to 12 m. (unlimited horse-power).—100-h.p. "Gardner-Serpollet" (12 m.), 55-h.p. "Napier Minor" (10·67 m.), and 12-h.p. "Blitzmädel" (12 m.).

Class 3b, for boats 8 to 12 m. (50-h.p. maximum).—24-h.p. "Kamper" (10 m.), 50-h.p. "Princess Elisabeth" (8·01 m.), and 32-h.p. "Mercedes IV" (11·8 m.).

Class 5a, for boats 6½ metres and under (16-h.p. maximum).—15·8-h.p. "Undine" (6·45 m.), and 15-h.p. "Hirondelle" (6·4 m.).

In the Harbour motor boat section there are nine boats entered in Class A, for boats with over 8-h.p., and in Class B, for boats having 8-h.p. or less, there are ten entries. We learnt from Mr. S. F. Edge, in Homburg, that he will steer his "Napier Minor" on the day of the race.

AERONAUTICS.

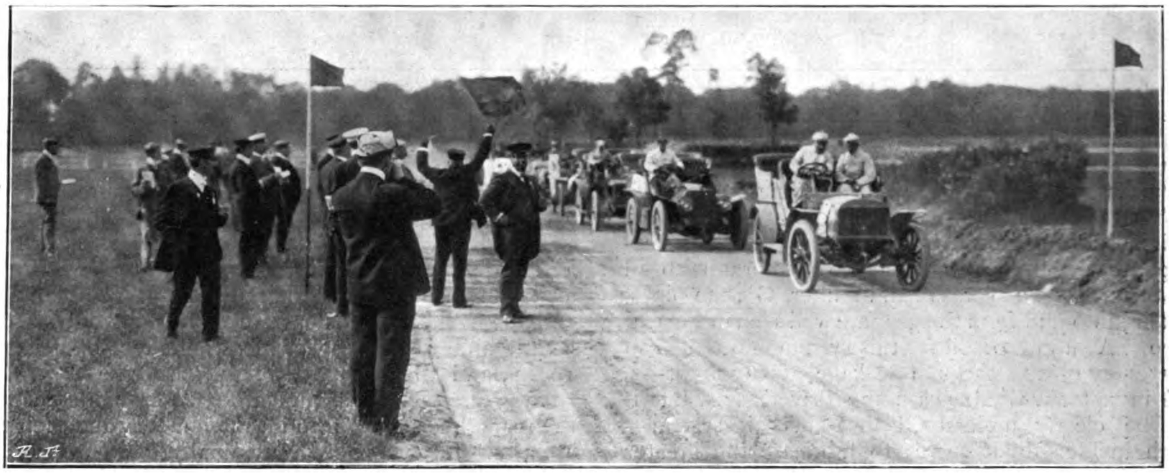
IT is stated that those who have already entered for the Aeronautical Competition at St. Louis are the following:—Santos-Dumont (Paris), Stivin (New York), Hutchinson (Chicago), Williams (San Francisco), Curtis (Gilleapie), Davis (Gilleapie). As, however, one of the regulations is, as stated in THE AUTOMOTOR JOURNAL for January, 1903, that competitors must bring forward evidence that they have successfully navigated the air for a distance of one mile and back again to the starting point, we do not see that any of these intending entrants, with the exception of M. Santos-Dumont, are likely to be allowed to compete. None of them, at any rate, as we are aware, has any such feat to his credit.

John I. Thornycroft and Co., Limited.—The proposition put forward and summarised in our last issue by the directors of this company were, on Monday last, submitted to the general body of shareholders. After very satisfactory explanations and exhaustive figures had been submitted by the chairman of the company, Mr. W. M. Beardmore, a resolution was passed agreeing with the scheme of extension as already outlined by us. As we then stated the new undertaking to be acquired by the company, in addition to amalgamating John I. Thornycroft and Co., Limited, with the Thornycroft Steel Wagon Company, Limited, is at Southampton, and is the business of Messrs. Morden Carnay and Co. A satisfactory feature in the new amalgamation is that no intermediate profits whatever are being paid to anybody, the whole of the negotiations in the business having been conducted by the directors of the companies personally.

RACES, RECORDS, AND TRIALS.

Frankfort Races.—On the Sunday following the Gordon-Bennett Cup race, the scene was transferred to Frankfort, where, on the huge Oberforsthous track, the programme of races provided by the Frankfort Automobile Club, in conjunction with the German A.C., was successfully gone through before an enormous gathering of the public. No high speeds were possible owing to the bad state of the course for automobile racing.

The Opel-Darracq cars carried off a wealth of first places, in a small measure compensating for the breakdown on Friday, whilst the Mercedes cars took the rest of the first places, with the exception of the 5-mile alcohol race, for which they had not entered. Fritz Opel, in the race for the Peter's Cup, had a nasty accident, leaving the course, and making three complete turns after breaking down the barrier. By almost a miracle, neither he nor his car sustained any serious damage as a result of the incident, whilst none of the public were injured in the smallest degree. In fact, the judges re-started the race almost immediately after a false start. Willy Poege, on his racing Mercedes, ultimately secured the Louis Peter Cup, doing the ten miles in the time of twelve minutes. During the day, Théry, the hero of the week graciously consented to do a sprint round the course on the racing Richard-Brasier car, being enthusiastically received all along the line with shouts of "Vive la France," whilst the strains of the Marseillaise were heard from the bands in honour of the winner of the Gordon-Bennett Cup.



FRANKFORT RACE MEETING.—Starting the competitors in the Tourist Car Race (10 miles) which Fritz Opel, on a Darracq, won in 15 min. 24⅘ sec.

The chief results in the events were :—

Motor Bicycles, 3 *miles.*—1. Nicodemi (Puch), 4 mins. 49 secs. ; 2. Muller (Brennabor), 4 mins. 50 secs. ; 3. Glockler (Neckarslum), 4 mins. 42 secs..

Alcohol Race for 15-*h.p. Cars*, 5 *miles.*—1. Heuze (Cudell), 8 mins. 10⅖ secs. ; 2. Gleich (Adler), 9 mins. 1⅖ secs. ; 3. Lorezen (Beaufort), 12 mins.

14-*h.p.* 2-*cylinder Cars*, 5 *miles.*—1. F. Opel (Opel-Darracq), 8 mins. 10⅘ secs. ; 2. Boehm (Benz), 9 mins. 28⅘ secs. ; 3. Kruck (Peugeot), 9 mins. 55 secs.

Alcohol Race, 10 *miles. The Emperor's Prize.*—1. W. Poege (Mercedes). 12 mins. 29⅕ secs. ; 2. F. Opel (Opel-Darracq), 12 mins. 47⅗ secs.

24-*h.p. Cars*, 8 *miles.*—1. A. Opel (Opel-Darracq), 11 mins. 5⅕ secs. ; 2. Teves (Adler), 11 mins. 11 secs. ; 3. F. Opel (Opel-Darracq), 12 mins.

30-*h.p. Touring Cars*, 10 *miles.*—1. F. Opel (Opel-Darracq), 15 mins. 24⅘ secs. ; 2. P. Martin (Daimler), 15 mins. 28⅖ secs.

Louis Peter Cup (Holder : W. Poege).—1. W. Poege (Mercedes), 12 mins. 12 secs. ; 2. F. Opel (Opel-Darracq), 12 mins. 17 secs. Having won the cup two years running, this now becomes the absolute property of Poege.

The Gordon-Bennett Race Rules.—The proposal to alter the rules of the Gordon-Bennett Race put forward by the A.C.G.B.I. was last week carried a stage further when the matter was brought forward for discussion by Col. Holden, representing Great Britain before the International Commission of the race sitting at Homburg. This attitude has been brought about as a natural result of the decision of the A.C.G.B.I. to take steps to discourage inconsiderate driving. The idea is to have an International Race which shall be a test of durability and trustworthiness, and especially of efficiency; in which, for instance, the cars and their load shall not weigh less than a certain minimum weight (so as to provide a proper margin of safety), and in which, by limitation of fuel or other conditions, any except very moderate speed shall be made impossible, thus avoiding unnecessary risk to drivers, and at the same time tending to increase the efficiency of touring and commercial vehicles.

In consequence, a circular letter was sent to each of the recognised clubs asking to have a conference called prior to the Gordon-Bennett Race of last week. In this letter the following recommendations were submitted :—

That no challenge shall be accepted by the winning club which may reach that club prior to midnight on August 17th next—a delay of two months

That it is desirable, in the interests of the automobile movement, that the rules affecting the race for the Gordon-Bennett Cup be immediately altered, and that the altered rules should be settled at adjourned meetings of the conference, and be published not later than August 17th, 1904.

That Mr. Gordon Bennett be requested to authorise any alteration in the conditions and rules which may be agreed to by the majority of the clubs concerned.

That it is desirable that the race shall be not only a trial of speed and trustworthiness, but also a test of the efficiency of the motor and the car.

That it is desirable that the race should be for cars of a type which are required by the public for ordinary carriage purposes, and that the conditions shall include such provisions as will ensure that the race be run at moderate speeds which will not involve the danger or expenses of organisation which are inseparable from the existing high-speed racing.

That it is desirable that, in order to eliminate, as far as possible, results which are largely governed by chance, the race should extend over several days, and should approximate to the famous "Tour de France" race.

Vanderbilt Cup.—Last week we gave cabled particulars of the main rules governing this Cup, and the only point of consequence to add is that the competing cars must not weigh less than 881 lbs., nor exceed 2,204 lbs., each car having to carry two persons, each of whom must weigh at least 132 lbs. Already likely competitors are mentioned, including a high-powered racing car by the White Sewing Machine Company, and the new 90-h.p. racer of Harlan W. Whipple (which we illustrate in the current issue), and a racer now under construction by the Electric Vehicle Company. From England it is quite certain that S. F. Edge will take part with one of his high-powered Napier cars. One clause in the Articles of Conditions for the trophy is that the name of the trophy shall be the "William K. Vanderbilt, Junior, Cup," it being stated that the object of this clause is to prevent beforehand the shocking mutilation of the greatly worshipped name of W. K. Vanderbilt in similar fashion to the abbreviation of "James Gordon Bennett" to plain "Gordon Bennett," in connection with the famous Cup run for last week in Germany. This provision strikes us this side as extremely humorous, as it is difficult to realise the feeling which prompts the idea. To imagine that this new Cup will always receive its full title when spoken of is too ludicrous for words. Should such an absurdity be insisted upon under threat of withdrawing the Cup, considerable trouble may at once be saved by withdrawing it immediately, as, if contested for, the trophy will be known as the "Vanderbilt Cup" pure and simple. The drollest part of the whole thing is that in the very newspapers which shriek loudest against "hyphenated abbreviation" of the names of donors of cups, in the same issue of their journals give all the details of the competitions of the Cup under the bold head-line of "Vanderbilt Cup Conditions."

From New York a cable message, dated Monday last, states that Harry Harkness, on his Mercedes car, has beaten the Boston to New York record, having covered the distance—244 miles—in 6 hours 41 minutes.

On the mile track at Readville, near Boston, the automobile meeting, postponed from May 30th last owing to the rain, drew nearly 25,000 people and 1,400 automobiles together on the 12th of this month. The field was reduced to very small figures owing to various accidents both prior to and during the earlier racing events, the more important cars taking part being the 60-h.p. Mercedes belonging to A. G. Vanderbilt, driven by Sartorri; a car of the same make and power belonging to H. L. Bowden, known as the "White Ghost," and driven by himself; the 40-h.p. Renault of Wm. Wallace, known as the "Black Death," on account of it being the machine in which M. Renault was killed last year; and the Stanley steam racer, a picture of which appeared in our last issue. Some close races were witnessed during the day, the results being as follows:—

Five miles open, for all gasoline touring cars not exceeding 24-h.p.—Won by A. E. Morrison, 24-h.p. Peerless; E. R. Hollander, 24-h.p. Fiat, second. Time 7 mins. 8 secs.

Ten mile open, for all classes of motor cars.—Paul Sartorri, 60-h.p. Mercedes of A. G. Vanderbilt; H. L. Bowden, 60-h.p. Mercedes, second. Time 10 mins. 9 secs.

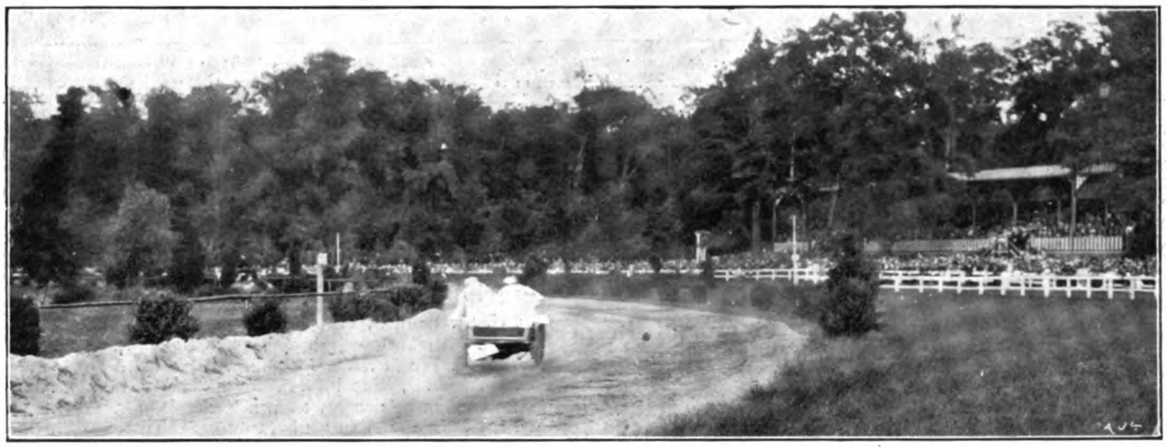
Five mile steam, all classes, Frank Durbin, 8-h.p. Stanley. Time 5 mins. 33⅘ secs.

Five mile invitation race, open to New England clubs, all classes, restricted to 30-h.p.—(1) William Wallace, 30-h.p. Renault; (2) A. T. Rogers, 20-h.p. Peerless. Time 5 mins. 11⅘ secs.

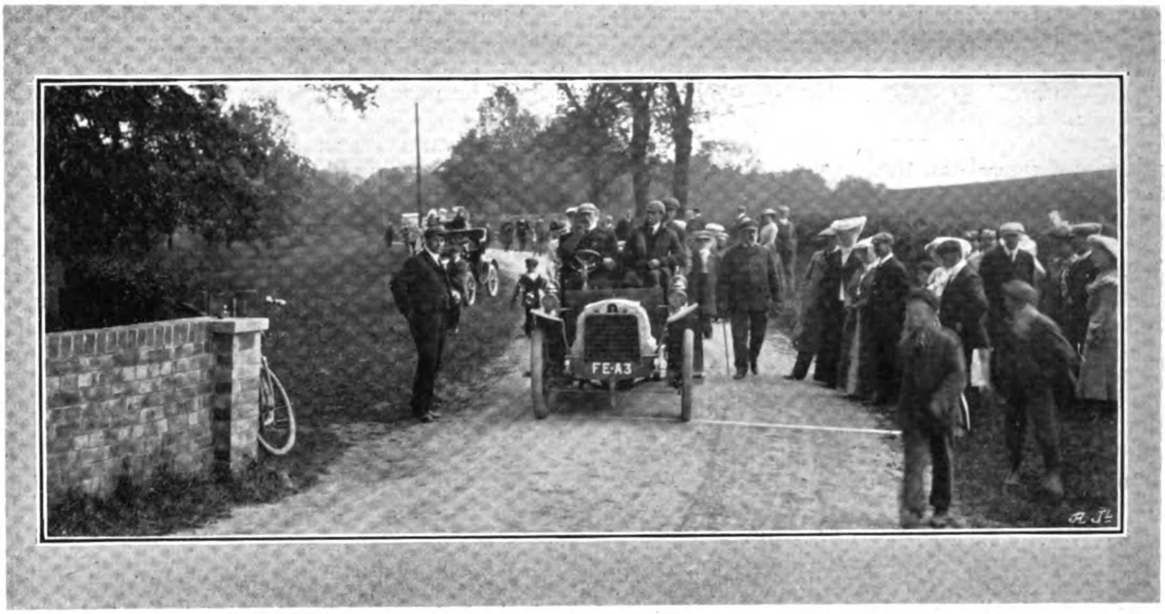
Five miles, class B, gasoline, 818 to 1,433 pounds.—(1) William Wallace, 20-h.p. Renault; (2) Otto Nestman, 14-h.p. Stevens Duryea; (3) Walter Winchester, 10-h.p. Franklin. Time 5 mins. 21⅗ secs.

Boston Herald Cup Race, ten miles, open to all machines.—(1) H. L. Bowden, 60-h.p. Mercedes; (2) Paul Sartorri, 60-h.p. Mercedes. Time 10 mins. 9⅕ secs.

The hill-climbing contest up Mount Washington, N.H., in the United States, has been fixed for July 11th to 16th. There will be 10 classes of cars at least. The course is 8 miles in length, over a private road which has cost about $100,000, having a rise averaging 1 in 6 for the entire distance. The finish will be at the Tip Top House. W. J. Morgan, who conducted the Ormonde meets for the Florida East Coast Automobile Association, is organising this event, and a number of trophies have already been secured. In addition to the hill-climbing contest, there will be a non-stop run of 100 miles through the mountains.



FRANKFORT RACE MEETING.—On Sunday, the Frankfort A.C. organised a race meeting as part of the series of festivities in connection with the Gordon-Bennett Race. Part of the course is well shown in our photograph, where one of the competitors is taking the bend.



LINCOLNSHIRE AUTOMOBILE CLUB.—The Market Rasen Hill Climb. At the starting point. The 18-h.p. Richardson Car at the line.

Hill-climbing Competition at Market Rasen.—Although the wind was rather boisterous, the sun shone brilliantly all day, and the periodical run of the members of the Lincolnshire Automobile Club to Market Rasen on Thursday, June 16th, at the invitation of Mr. and Mrs. A. A. Padley, took place under pleasant conditions. In connection with the run, Mr. Padley had thoughtfully arranged an interesting hill-climbing competition (handicap), and gave two prizes—a motor timepiece to the first and a motor jack to the second. Upwards of thirty cars attended from all parts of the county, and twenty-four of them took part in the competition. Bully Hill, where the event took place, is over one-third of a mile in length. The average of the whole ascent was a gradient of 1 in 15, but at the beginning of the climb, and at the finish, and once or twice between, the gradient was easier. However, near to and beyond the bend the hill rises to about 1 in 6, and it was here the cars found the greatest difficulty.

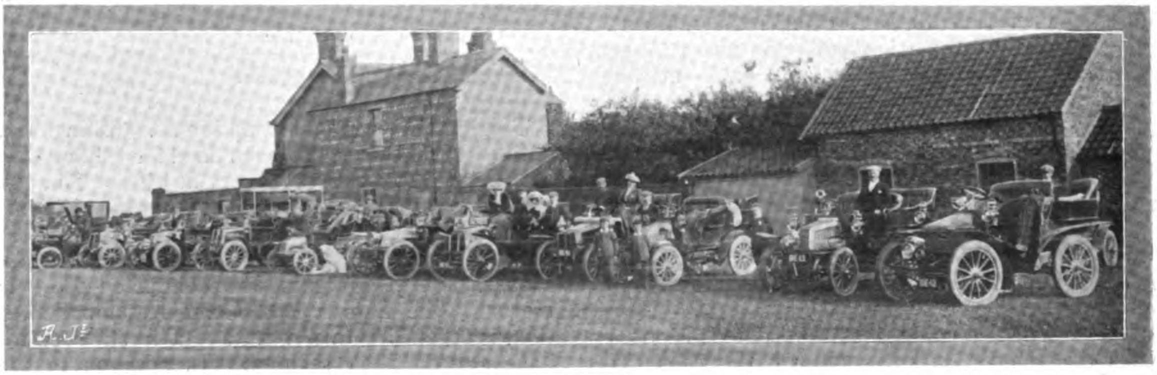
Three cars, a 12-h.p. Gladiator, 6-h.p. De Dion, and 8-h.p. De Dion, were in difficulties, and the first two were assisted, while the latter returned, and afterwards accomplished the distance in 2 min. 38 secs.

The following were the principal times :—

	min.	sec.
Mr. W. S. Foster, Lincoln, 24-h.p. G. Richard ...	1	35
Sir Hickman Bacon, 12 h.p. Panhard	2	4
Mr. W. R. Pennell, Lincoln, 10-h.p. Locomobile ...	2	5
Mr. W. S. Richardson, Lincoln, 18-h.p. Richardson...	2	5
Mr. F. Richardson, Sibsey, 10-h.p. Wolseley... ...	2	6
Mr. C. W. Pennell, Lincoln, 12-h.p. Richardson ...	2	6
Mr. Jeffrey, Gainsborough, 12-h.p. Darracq	2	7
Mr. R. M. Wright, Lincoln, 9-h.p. Clement	2	20
Mr. W. Nissler, Lincoln, 8-h.p. De Dion	2	22
Major Goddard, Lincoln, 12-h.p. Richardson	2	27
Mr. J. S. Nainby, Thorganby, 7-h.p. Panhard ...	2	42
Dr. P. Sharp, Brant Broughton, 12-h.p. Richardson...	2	43

Mr. A. A. Padley officiated as starter, Mr. W. B. Jevons, of Market Rasen, and Mr. T. E. Foster, of Lincoln, as timekeepers, and Messrs. G. and S. Charlton-Jones, of Holton Hall, and Mr. Seagrave, of Lissington, as stewards. The times given above do not necessarily indicate the prize winners, which will be determined under the A.C.G.B.I. formula and announced later.

After the competition, the members returned to Hill House, where they and their friends were entertained to tea. The run was one of the most enjoyable the club has yet held—the competition, of course, adding much to the interest of the gathering.



LINCOLNSHIRE AUTOMOBILE CLUB.—The Market Rasen Hill Climb. The competing cars.

THE hill-climbing competition arranged by the Sheffield Automobile Club, and which is restricted to members' cars, took place at Grindleford on Saturday afternoon, June 18th. There were twenty-seven entries, and all except Mr. C. D. Leng turned up at the start. The road selected was the same as that on which this competition was held last year, and lies between Grindleford Bridge and Fox House near the top of Padley Wood. The course—about 1½ miles long—has an average gradient of 1 in 17, with a maximum slope of about 1 in 10, and as it is conveniently situated with relation to Sheffield, the occasion was the means of bringing together many sightseers from that town, who, undeterred by the early signs of rain, were subsequently rewarded by the weather remaining fine. Owing to the excellent organisation by the officials, the programme was successfully concluded without delay, and the official results were quickly available. We append these results in tabular form below. It will be noticed that the highest marks are not obtained by the fastest car, these being calculated by means of the A.C.G.B.I. formula, which includes factors representing horse-power, weight, price, &c. The honours of the event fall as will be seen from the table to two Hallamshire cars, one gaining highest marks, and another doing the fastest time.

Results of Padley Wood Hill Climb.

No.		Marks,	Miles per hour.	Time over Course.	
				m.	sec.
1	F. Churchill, 14-h.p. Hallamshire...	1349	13.0	6	54.6
2	A. S. Fawcett, 15-h.p. Darracq ...	1339	13.48	6	40.6
3	S. W. Fawcett, 24-h.p. Darracq ...	1233	13.18	6	49.6
4	F. Churchill, 10-h.p. Hallamshire...	1187	13.56	6	37.8
5	Brook Shaw, 6-h.p. De Dion ...	1133	10.9	8	14.0
6	J. E. Evans, 12-h.p. Darracq ...	1095	10.3	8	44.2
7	J. F. Pickering, 10-h.p. Norfolk ...	965	10.08	8	55.4
8	*H. Cooper, 10-h.p. Wolseley ...	904	9.7	9	12.4
9	G. W. Grazebrook, 16-h.p. Dennis	874	11.66	7	43.0
10	Ben Hind, 9-h.p. Clement ...	860	9.25	9	44.2
11	Jas. Barber, 12-h.p. Belsize ..	855	8.3	10	51.0
12	Harvey Foster, 10-h.p. Wolseley...	835	10.08	8	55.4
13	Jas. Hind, 12-h.p. La Plata ...	778	8.0	11	4.4
14	J. H. Pickford, 10-h.p. Wolseley...	773	8.3	10	50.6
15	C. A. Clarke, 6½-h.p. Gladiator ...	755	6.6	13	34.0
16	W. N. Drew, 7½ h.p. Wolseley ...	747	8.8	10	11.0
17	Jas. Barber, 6-h.p. Belsize...	722	7.78	11	33.4
18	H. G. Barber, 12-h.p. La Plata ...	709	8.2	10	58.2
19	Dr. O'C. Parsons, 10-h.p. Ariel ..	685	8.6	10	23.6
20	E. W. Hadfield, 6-h.p. Regal ...	666	6.97	12	54.4
21	H. Barber, 10-h.p. Wolseley ...	635	7.7	11	41.8
22	F. Mellows, 6-h.p. La Plata ...	611	6.6	13	35.6
23	J. Ellis, 8-h.p. M.M.C. ...	575	6.5	13	45.4
24	W. James, 6½-h.p. Boyer	564	4.93	18	13.8
25	W. Watts, 6½-h.p. Humber ...	494	5.4	16	35.0

* Winner in 1903.

Circuit des Ardennes.—The distance of the race this year will probably be 600 kiloms. without a stop, and, subject to previous notice being given, the A.C. Belgium will probably be prepared to time cars for non-stop runs up to 1,000 kiloms. The entire course is to be "Westrumited."

ALREADY entries are beginning to come in for the Reliability Trials for Light Cars, the rules of which we published last week, two of the first cars to be entered being two 6-h-p. De Dion Bouton vehicles. The trials take place, commencing on August 29th next, with Hereford as a centre, from which the cars will start daily.

DRIVING a 20-h.p. Talbot car, Mr. D. M. Weigel, starting on Wednesday afternoon last, is attempting to break the 2,000 mile time record. He proposes to drive from London to Perth and back twice, a distance of 1,600 miles, and make up the balance of 400 miles on another route. The legal speed throughout the journey, it is announced, is to be strictly observed by Mr. Weigel.

Perigueux Hill Climb.—Organised by the Dordogne A.C., originally fixed for May 15th, and postponed until to-morrow, Sunday, it is now definitely announced, has been refused authorisation by the authorities.

St. Etienne Tourist Trial.—The results of this tourist run over 400 kilometres in France are as follows:—*Cars* (Reliability): 1. Perret, 18-h.p. Peugeot; 2. Laperto, 20-h.p. Automoto; 3. Jilfrois, 25-h.p. Peugeot. *Motor Bicycles*: 1. Dubost, Rochet; 2. Deborme, Brounot; 3. Chazay, Brounot.

MOTOR CYCLING.

Motor-Cycle Reliability Trials in Lincolnshire.—After a most exhaustive test, the Reliability Trial of motor-cycles, organised by the Peterborough and District Motor Club, has come to an end. Originally there were 13 competitors, which were reduced to 7 in the first round, 3 in the second, and 2 in the third. The survivors—B. C. Holmes (Peterborough), 3½-h.p. Vinco-Minerva (Clipper tyres), and T. Woodman (Peterborough), 2¾-h.p. Bat (Clincher tyres)—entered on the fourth round on Tuesday. They first ran 100 miles over the original course to Lincoln and back, returning to Peterborough in the afternoon. After an hour's rest for refreshments they entered upon a second 100 miles, this time riding to Hitchin and back. Both completed the 200 miles non-stop without the tie being decided. Under these circumstances it was arranged that the run should be continued throughout the night, travelling again to Lincoln and back. The heavy rain, however, entirely prevented this. The competitors, it is understood, were willing to divide the honours, but the committee decided that another 50 miles should be run to Folkingham and back on Wednesday night. Holmes reached the turning point exactly to time, but Woodman did not arrive until several minutes afterwards with a badly-punctured front tyre, which went amiss soon after the start. However, he pluckily rode on in this condition and completed the fifty miles non-stop. As no repairs or adjustment were allowed to the machines Woodman, on Thursday, decided to retire from the contest. Holmes therefore takes the silver cup, Woodman the gold medal, and Brown (who rode a 2½-h.p. Bradbury, and who was thrown out of the competition by a broken belt after travelling 317 miles) the silver medal with gold centre. Holmes and Woodman rode 625 miles before deciding a winner. In our issue for June 11th (p. 715) the winner is seen in a photograph which we published. He is a well-known Lincolnshire motor cyclist, and has won many valuable prizes for riding in all parts of the country. Last year he attempted to break the motor-cycling record from Land's End to John o' Groats, and was well in front of time when he met with an accident at Warrington which caused his retirement. He served with the Lincolnshire Volunteers during the South African War, and was wounded in the leg at Nitral's Nek.

Motor Bicycle Trial at Cannes.—The results of the contest organized by the *Cote d'Azur Sportive* over a distance of 135 kiloms., and of which we gave particulars last week, are announced. As we anticipated, Lamberjack, on a 2¾-h.p. Griffon, is at the head with 690 points, the next best being Guillet (2¾-h.p. Werner), 662 points; Inghebert (2¾-h.p. Griffon), 653 points. The lowest points were 584, obtained by Ellena on a Peugeot machine.

AN attempt to create a world's record between London and Rome on a Werner motor bicycle was commenced by Signor H. Toscano on Monday last, starting from London at 5 p.m., Newhaven being the point for crossing by the night boat to Dieppe. During the run he hopes to beat his own record between Paris and Rome, completing the full journey in about six days.

CLUB DOINGS.

SOUTH-EAST ESSEX AUTOMOBILE CLUB.—The cars which took part in the Inaugural Meet of this recently-established Club.

Derby A.C.—On Wednesday of last week a visit was paid by members of this club to the Ryknield Motor Company's works at Burton-on-Trent. At the invitation of Mr. A. J. Clay, of Holly Bush Hall, one of the directors of the Company, about sixty members availed themselves of the opportunity of inspecting these up-to-date works, where the operation of making all the parts of the cars was followed with keen interest, some experiments demonstrating the strength and quality of the materials used in construction forming an attractive feature of the tour through the shops. Holly Bush Hall, about eight miles distant, was afterwards visited for tea, Mr. Francis Bolton, in subsequently proposing the health of the host of the day, expressing the hope that they might soon see a Ryknield car doing duty on behalf of Great Britain in the Gordon-Bennett Race.

The Herefordshire, Gloucestershire, and South Wales A.Cs. had a very successful inter-Club run to Tintern on June 18th, when about thirty cars, varying in power from the little 6-h.p. De Dion to the new 18-h.p. Daimler, turned up, besides one or two motor cycles.

The day could not have been more suitable, as the rain which fell the previous day prevented there being a great deal of dust, though this was more troublesome on the return journey.

The arrangements made by Mr. A. Arthur Dale, Hon. Sec. of the Gloucestershire Club were excellent in every way, he having had a list of the day's arrangements printed for every member, another printed form for each seat at lunch, and large notices prohibiting smoking in the immediate vicinity of the cars. Mr. Dale seems to be just the sort of secretary a club requires, and a man it is a pleasure to meet. We wonder if he also made the special arrangements for the weather.

Lunch was taken at the Beaufort Hotel, Tintern, after which short and appropriate speeches were made by Mr. Hereford, president of the Herefordshire Club, Mr. Wyatt, president of the Gloucestershire, and Mr. Neale, Hon. Sec. of the South Wales. Mr. Hereford's last remark caused much amusement in that it drew attention to the fact that outside a policeman was waiting for all of them.

Mr. Neale, who seemed to think the officer in question was a second Sergeant Jarrett, remarked that he had given him some legitimate work to do in looking after the cars while we lunched.

The scenery at Tintern cannot be over praised, and altogether the outing was an exceedingly pleasant one.

THE HARTLEPOOLS A.C.—The opening run of this Club was held at the beginning of this month. The run was to Croft Spa, and was well attended, 28 members turning up in time for lunch. Afterwards a run was made to Ripon, Yorks., returning the same evening to West Hartlepool after spending a most enjoyable day's outing. Our photograph shows the cars at Croft Spa Hotel.

Ladies' Automobile Club. — The first annual general meeting of the club will be held in their new quarters at Claridge's Hotel, on Thursday next, the 30th June, at 12 noon.

The "Biograph Tea" with strawberries will be given on the same day at 3.15 p.m. The exhibition will include the Gordon-Bennett Race of 1904, many pictures taken during the Homburg Week, and also a picture, taken from Hyde Park Corner, of the procession of the club on the 9th June.

On Monday, the 4th July, there will be a Club Run to The Hall, Bushey, Herts., for tea, which, if the weather be fine, will be partaken of in the garden.

There will be no formal Meet of the cars in London, but it is expected that many will be present at The Hall about 4.30 p.m. It is suggested that members should go to Bushey, *viâ* Chipping Barnet and Elstree, and return *viâ* Watford, Stanmore and Edgware.

Lincolnshire Automobile Club.—Captain J. A. Cole, J.P., presided over a meeting of the committee of the Lincolnshire Automobile Club at headquarters, on Wednesday week. Dr. Gilpin, Mr. Cyril Nelson, Dr. Lowe, Mr. W. R. Pennell, and Dr. Cragg (hon. sec.) were also present. The following new members were elected :—Mr. W. Haddon Owen (Louth), Mr. R. H. Fowler (Louth), Mr. R. A. Pelham (Gainsborough), and Mr. R. Connell (Gainsborough). Others proposed for election were :—Mr. Hugh Peacock (Gretford Hall), Mr. T. Ives (Lincoln), Captain E. Tatchell (Grantham), and Mr. F. H. Atkinson, M.D. (Grimsby). The question of alcohol being a duty-free spirit for commercial purposes was brought up by Dr. Lowe.

A desire having been expressed by some of the motor cycling members of the club to form a motor cycle section, it was decided, on the motion of Mr. W. R. Pennell, to invite such members to a meeting on June 22nd, to see what could be done in the matter.

A report of the hill-climbing competition of the club at Market Rasen appears elsewhere under Trials.

Automobilism has always found great favour with the theatrical profession, and Mrs. Brown Potter, who in the above photograph is seated in her Oldsmobile, was one of the first of the many talented actresses who early recognised the pleasures of motoring.

South-East Essex A.C.—The inaugural meet of this newly-formed Club, of which we reproduce a photograph, took place on the 12th inst. at Bridge House, Prittlewell, when fourteen cars and eleven motor cycles attended.

The brilliant weather was a most happy augury for the Club's future. Much to the regret of the Committee, it was found impossible to send invitations to all the motorists in the district, chiefly on account of the difficulty of getting in touch with them, but it is hoped that this will not deter them from attending any future functions which the Club may organise to forward the sport of motoring. A noticeable feature of the gathering was the number of ladies in the cars. Among those members present with cars and cycles were the following :—

Messrs. Baersalmon, Burrup, Calder, R. L. and A. P. Curtis, Cripps, Crane, Crookham, Drury, Ellis, Foster, Green, Herrtage, Jarratt, Jewell, Kerridge, Lister, Morgan, Parsons, Sloman, Spencer, Warnery, and Winter.

It is the intention of the Club to hold weekly meets covering various localities, particulars of which can be obtained from the Honorary Secretary, Mr. R. L. Curtis, Bridge House, Prittlewell.

Sheffield Automobile Club.—The Padley Wood Hill Climb was successfully carried through by this club last Saturday. Particulars appear elsewhere in "Races, Records, and Trials."

Scottish Automobile Club (Western Section).—A club meet and picnic took place at Turnberry, Ayrshire, 50 miles from Glasgow, on the afternoon of Saturday last. The members of the Turnberry Golf Club had kindly granted permission to have the cars placed within their enclosure, and the privilege of the links to any members who desired to play golf. There was a fair turn-out of cars. The members lunched *al fresco* on the links, after which the afternoon was spent on the course, golfing or otherwise, or on the seashore, as the various members and their friends were inclined.

Siam requires a motor van for carrying bullion. The Royal Mint authorities at Bangkok, Siam, are desirous of obtaining a motor van for the transfer of ingots, coin, &c., up to one ton. The specification states that :—

> The van must have a speed up to 10 miles per hour, and have a hood for the driver and the accompanying official, also a step in the rear for another official. Behind this driver's seat a simple box is required for the accommodation of the "transfers" (coin, &c.). This box may be 3 feet square and 18 inches deep ; it should have a lid lifting vertically, and a "tail board or falling side." The van must be capable of taking a load of one ton up an incline of 1 in 5 with ease, at a speed of 8 miles per hour. The wheels, axles, springs, and frames must be very strong to stand rough usage. The van may be propelled by either a steam motor or an explosion motor. The fuel obtained easily in Siam is Sumatra petroleum and liquid fuel. Light oils are costly and very wasteful (in the tropical climate of Bangkok).
>
> In stating the price at which such a van can be supplied, makers must give full particulars of the following : motor, transmission (including reverse), frame, wheels, tyres, feed tanks, radiators, boiler, if any, &c.
>
> Amount of fuel used per ton mile must also be given. The mechanism must be as simple as possible to be efficient, and it must be protected from the severe showers which occur there by being well cased in. Communications should be addressed to J. W. Hinchley, H.S.M. Royal Mint, Bangkok.

Sir Ernest Cassel and the Duchess of Manchester are both recent purchasers of new 18-28 h.p. 1904 Mercedes cars, which they have secured through the Cannstatt Automobile Supply Association, of 11, Charing Cross Road.

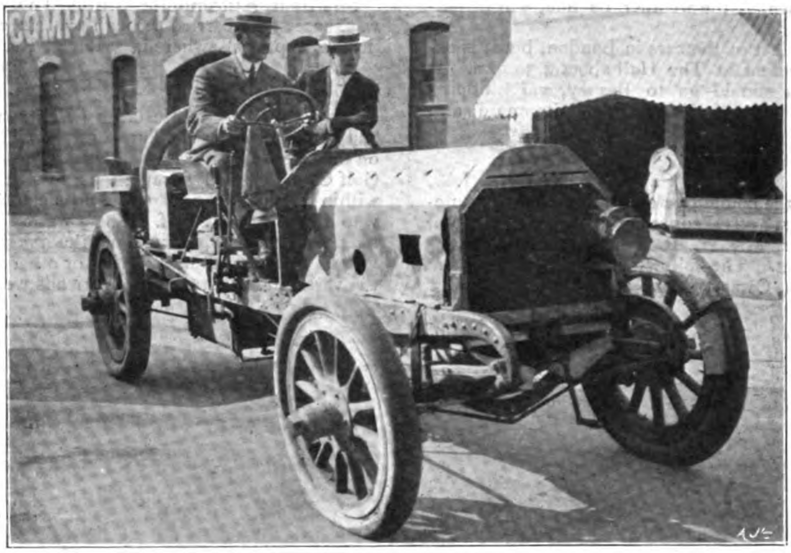
HER MAJESTY THE QUEEN has just received delivery of her Wolseley car, which she selected after personal experience with another of the same make.

THE Hon. C. S. Rolls advises us that the 10-h.p. Napier car belonging to him mentioned in the article which we published last week dealing with "A victim of last across," was not either being driven by him at the time of the accident, nor was he on the car.

WE have always commented very strongly on the conduct of drivers of cars who think fit, while in charge of a vehicle, to indulge in immoderate potations of alcohol. So we are not at all sorry that Walter Pratt, an engineer of Norwich, who, in this condition whilst driving a motor car ran into a flock of sheep, killing one and injuring thirty-seven others, was sent to prison for three weeks. If we have any regret in the matter at all, it is that his sentence did not involve hard labour.

FROM April 20th to June 4th the London County Council have registered 506 motor cars and 365 motor cycles, this making a total number of cars and cycles registered up to June 4th, since the commencement of the year, of 3,420 and 2,428 respectively. During the same period 1,338 licences to drive motor cars or cycles have been issued, and 17 general identification marks for motor cars have been assigned to manufacturers or dealers, making the total number of licences for the year to that date 8,533, and manufacturers' identification marks 264.

THERE are two policemen in the neighbourhood of Basingstoke who are suffering at present from violent shock. They had taken out a summons against Mr. Walter Munn, of the De Dion-Bouton Company, on the usual charge, and Mr. Walter Munn got off. Armed with stop-watches (apparently somewhat worse than usual), they came confidently before the Basingstoke Bench with the sure and certain hope of obtaining a conviction, as that Bench had never been known to acquit an automobilist before. Mr. Munn, however, after examining the watches, made it plain, even to the Basingstoke Bench, that they were quite unreliable, and the case was dismissed. The astonishment of the police is stated to have been most profound, and they were led from the Court in a state of complete docility. It is understood, however, that their condition is not critical, and that they may be expected to resume their duties at an early date.



THE AUTOMOBILE IN AMERICA.—Whipple's Giant Car. Harlan W. Whipple's Car, made at Scott Iron Works, Baltimore, under special order. Wheel base, 10 ft. 6 in.; chassis, 14 ft. 9 in. long; wheels, 36 and 38 in.; engine, 4-cylinder, independent cylinders, 6 in. by 6 in., develops about 80-h.p.; four speeds forward, one back; control easy; will be raced as shown, but for touring will be fitted with tonneau to hold seven people. Has magneto ignition.

A HITCH, probably only of a temporary character, has taken place in the scheme for amalgamation between the American Automobile Association and the American Motor League, under the title of the American Motor Association.

THE manufacturers of the Ford car in America have determined to extend their premises very greatly. The factory at Detroit is to be enlarged to ten times its present size.

OVER 2,000 cars are expected to take part in the St. Louis automobile run next month. Elaborate arrangements are already being made along the entire route, so that the whole event shall be carried through successfully. Texas and Southern California have both promised to send contingents to swell the crowd.

WE have received a letter from Mr. Dimmock, of Bridgetown, Barbados, contradicting the statement made in the columns of a contemporary that the first motor car is being this month introduced into the island by Mr. F. N. Martinez. Mr. Dimmock points out that on the contrary the first car was introduced by himself as long ago as last July.

NEW INVENTIONS.

Patent Specifications Published.

Applied for in 1903.

Published June 9th, 1904.

3,663. H. N. BICKERTON and others. Internal combustion engines.
10,859. A. NICHOLSON. Carburettors.
11,494. G. LYONS. Convertible cycles and motor cycles.
12,800. J. D. ROOTS. Motors.
13,430. HUMBER (LIMITED), AND H. E. EARL. Motor cycles.
15,496. E., T. H., AND L. GARDNER. Internal combustion engines.
15,663. R. W. NEALE. Motor car lamps.
15,728. G. HOULON. Carburettors.
16,220. SOC. FRANCAISE CAIL. Admission valves.
16,993. L. RENAULT. Fore-carriage axles.
28,025. R. ALGRIN. Valves.

Published June 16th, 1904.

15,847. A. KNIGHT. Motor carriages.

Applied for in 1904.

Published June 9th, 1904.

830. E. MARX AND P. HEUER. Variable speed gears
1,590. A. E. BRILLIE. Apparatus for supplying liquid fuel.
3,887. T. M. AND W. DAVIES. Appliance for attachment to a wheel of a motor car to enable the car to be run independently of the tyre of such wheel.
7,486. E. SOLLER. Explosion motors.

Published June 16th, 1904.

3,651. — HEATH. Hydraulic brakes.
6,451. J. HEISIG. Coolers.
7,806. SOC MIMARD BLACHON ET CIE. Change-speed transmission-gear.
9,090. J. W. HALL. Carburettors and governing devices.
9,111. M. FERRERO AND A. FRANCHETTI. Explosion engines.
9,467. GANZ AND CO. Mixture regulating valves,

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